

**COOP'S
SATELLITE
DIGEST**



SEPTEMBER 01, 1984

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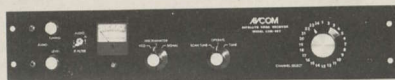
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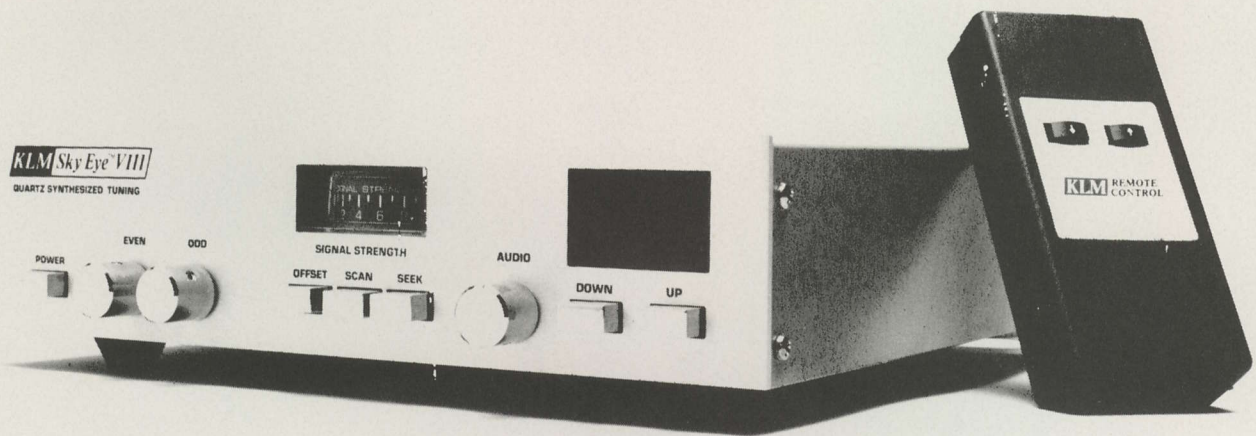
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TOP OF THE MONTH

NASHVILLE. You are either there or headed there as you read this. Naturally we invite you to come by and visit COOP and the gang at booth 1012. You are also invited to attend the CSD/Industry 'Fifth Birthday Party Celebration' now scheduled for 6 PM on Monday the 3rd. Finally, Monday the 3rd is your last opportunity to enter the "Pioneer's Pioneer" selection contest. Entry forms available one day only at the Boman Industries booths (235 to 239) and the CSD booth.

OUR report on field testing of the Paracclipse 4.8 meter international grade system leads off this month. This is an amazing antenna with plenty of sound thinking involved in the design.

MICROBEAM by Channel Master is a 'lower cost' alternative to transmitting multiple-channel SMATV/CATV across areas where no subscribers exist. We look at Microbeam this month and applaud Channel Master for the innovation.

HBO seems muddled with their final-stage planning for entering the C band direct (CBD) business and Coop reports on the latest 'strategy' in this up and down venture in his Comments section.

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RIP VAN WINKLE/J.K. Vines	page 27

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OUR COVER/ More than 25,000 TVRO receivers later, **John and Judi Ramsey**, one of the most successful 'Mom and Pop' TVRO OEM duos in the industry are looking ahead to head-to-head competition with the Far East, 'monolithic chip' receivers and high speed divide-by technology. See Coop's Comments this month, page 6.

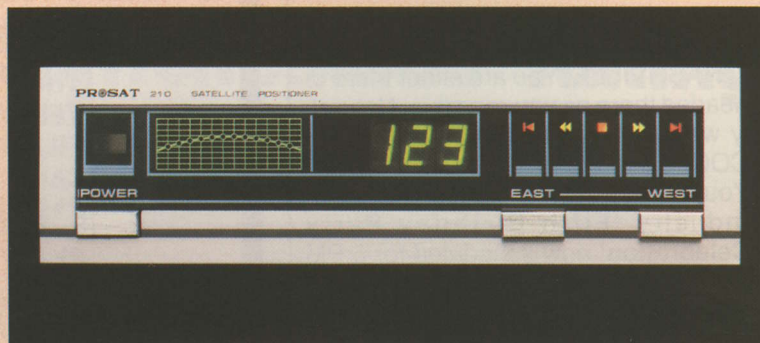
COOP'S SATELLITE DIGEST



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THE PRODUCT,

- Optional UHF remote control
 - East-West travel limiters
 - Automatic overload shut-off
 - Large LED display of dish position
 - 36V Output power reduces shock hazard
 - Compact cabinet
 - 1 Year factory warranty
-
- Modular design for easy field service
 - Double weatherproofed gear box
 - Slip clutch protects no-rust gears
 - Stainless steel drive shaft
 - Ball screw drive, standard
 - Swivel attachments smooth dish travel
 - 1 Year factory warranty
 - 18", 24", and 36" lengths



Introducing PROSAT 210

The PROSAT 210 has been designed from the ground up to be simple to operate and easy to maintain. Constructed from the finest materials and packed with advanced technology, the PROSAT 210 boasts features that more expensive units lack, making it one of the best buys in its class.

From the controller's advanced optional UHF remote control with large LED readout, to the actuator's polished stainless steel extension tube and ball screw drive, the PROSAT 210 is simply unbeatable at any price!

THE SUPPORT,

SatNet



PROSAT 210 is distributed exclusively by SatNet, the International Satellite Distributor Association. SatNet's regional distribution system provides you with the cost, warranty and sales support benefits of a central source with service provided by our local distributors.

SatNet offers a full line of products and accessories for consumer and commercial satellite systems.

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THE BOTTOM LINE

This may well be the most convincing part of our message. Contact the SatNet distributor nearest you to see why the PROSAT 210 is unbeatable.

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Distributors—are you interested in providing this kind of support for your dealers? Contact Bob Norman, P.O. Box 391, Lakeland, FL, 33802, (813) 858-8373.

COOP'S SATELLITE COMMENT

- HBO/ Now You See It; Now You Don't
- Sat-Tec's Resurrection
- Avoiding Bankruptcy

RESURRECTING Ramsey's Sat-Tec

About mid afternoon on July 17th I found myself in the company of Peter Sutro and mild-mannered Kenny Schaffer. Sutro is a name familiar to most; active as a distributor, as an SMATV promoter and operator, and serving the industry on the SPACE Board of Directors. We were locked in horrendous traffic trying to pry our way into the Lincoln Tunnel from the Manhattan side. Schaffer kept up a running commentary of his trials and tribulations of attempting to operate a TVRO (and business) in the bowels of Manhattan; just blocks from the world headquarters of such usually adversary firms as HBO, Showtime, and the three major networks.

"Back before I was engaged to Marian" he began a new story "I was in a bar down on 57th street one night. This black hooker sided up to me and we started a conversation. I decided I wanted to show her my TVRO, a couple of blocks away.

"I asked her 'Have you even seen a four foot dish?'. She looked at me with an incredulous stare and didn't answer. I decided to repeat the question, only this time it came out differently. 'Have you ever SEEN a four FOOT dish?' I asked. She smiled at me and ran her hand down my arm."

"Not on a WHITE MAN, honey!"

Traveling with Schaffer is an unsettling experience. As most readers are aware, I spend a fair number of hours per month in small airplanes. Just getting back and forth to 'the mainland' from Provo requires 8 hours or so (round trip) in the air in old-style D-18 two engine craft. Sutro had somehow convinced me that we would be making the best use of our limited time if we allowed Schaffer to pilot us from a New Jersey side general aviation field to our destination: Rochester in upstate New York. We were heading to visit John and Judi Ramsey who have operated Sat-Tec (aka Ramsey Electronics) from tiny Penfield, New York since 1979 or so. Until Peter made the suggestion, I was not aware that Schaffer had a pilot's license.

"Multiple engine, IFR rated" Schaffer had snapped back. And then he recalled "I remember the time I flew across the English

Channel, upside down, trying to get into the 'Guinness Book of World Records.' They didn't accept me after I went to all that trouble . . .". I decided, against everybit of better judgement I had that I would tag along at least as far as the airport. Hundreds of private plane flights to my credit (probably not enough to make 'Guinness' however) I am modestly familiar with the art of preparing a single or multi engined craft for take-off; they call it 'pre-flight.' I was going to watch Schaffer CLOSELY as he did this on the single engine plane, and if he 'passed' in my judgement, I'd ride with him. If not, well, I still had my commercial flight reservations.

Schaffer 'passed' and 90 minutes or so later as I awoke from a sound snooze I thought the ground below looked familiar. "Do YOU know where we are?" I asked Schaffer. He flinched and handed me the map. I didn't need it. Right below was the house I had lived in from 1943 to 1953 or so. We were passing, at 6,500 feet, over the suburbs surrounding Ithaca (N.Y.). I made the mistake of pointing that out to Schaffer. Ten seconds later we were banking sharply to the left, and losing altitude rapidly. Schaffer wanted me to get a GOOD look at the old homestead. When we got low enough for me to see the panic stricken faces on the people in the yard below Kenny shot off to the right and leveled out over Cayuga Lake. Sutro, nursing a bruised arm and sore hip from an accident the previous day while he was testing some 5 and 6 foot dishes, fortunately had his seat belt still fastened or he and Schaffer would have been sharing the same seat. I made a mental note not to point things out on the ground again, while flying in any airship commanded by Kenny Schaffer.

My plans for visiting the Ramsey duo that operates Sat-Tec had been building in my head for several months. In reviewing the first 58 issues of CSD, I discovered much to my surprise that John Ramsey had never been on a CSD cover. Since he practically invented TVRO receiver mass production, I clearly 'owed' John one. When you also consider that Sat-Tec has been advertising on our back cover since July of 1980 (the oldest continuous advertiser in CSD), a better businessman than I would have noticed this 'oversight' long ago.

Sat-Tec has an interesting 'image' in the marketplace. They have always been 'low priced.' They have usually been 'the lowest priced' receiver in the market. And that starts back when Sat-Tec broke the 'magic \$1,000 price barrier' in mid-1980.

I first used a Sat-Tec receiver in 1980; it was a proto-type Sat-Tec 'R2' that brought in our Russian Molniya bird reception from Oklahoma when we pioneered that type of reception in May of that year. I have played with most of the Sat-Tec models since that time.

"I have a real problem . . . the dealers seem to use our receiver as a 'price-leader' to get people into the store. They couple it with a small dish and higher-noise-LNA and they say to the customers 'Here, this is what you can get for \$XXXX.00; NOW, for just \$XXX more, see what you can get with THIS system!'. How do I get out of that rut?" John pondered.

The Sat-Tec receiver line started off being lower priced because of John's convictions. First, John is personally challenged, as a design engineer, to remove 'cost' from products. His idea of the perfect TVRO receiver is that it will have one part. Just one. To reach that goal, he and his growing engineering staff concentrates on constantly evaluating and re-evaluating new circuits. I believe that Sat-Tec has led just



SCHAFER shows off 'his' city; the 'big-apple' at 1,500 feet.

about every major receiver cost-lowering cost-reduction move in TVROs since they started in the business.

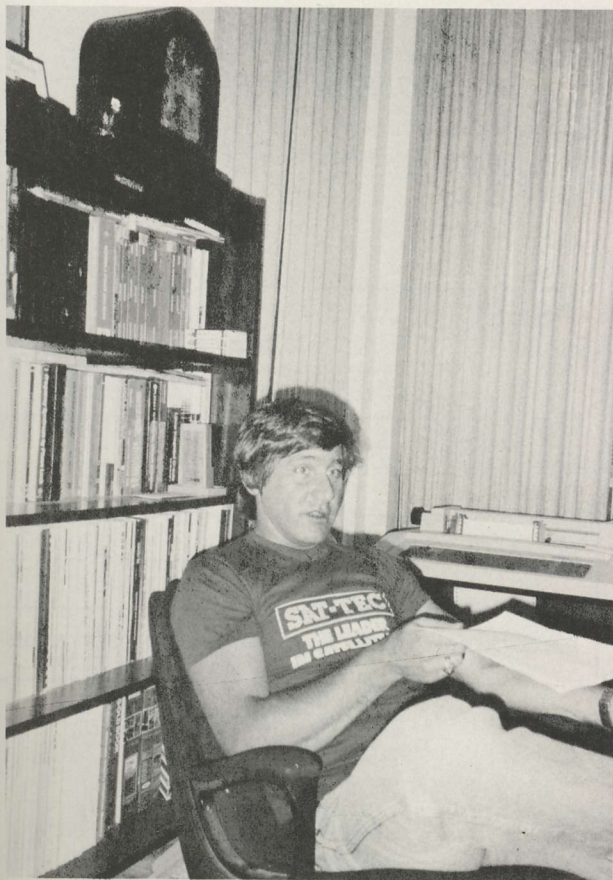
After being challenged by the push to remove needless parts, John is motivated by competition. He is especially challenged by competition from off-shore production houses. We talked about the pricing drift (downward) of this past summer.

"I don't see LNA prices EVER coming back up" he started. "And with Japan almost ready to unleash 'Monolithic' (single piece, integrated circuit) LNAs on us, there is yet another LNA price and feature war just ahead." When did I think this would catch up with TVRO receivers, as well?

The handwriting is on the wall. If the Japanese can put together a 50 dB gain LNA in a single chip that measures 2 inches by 1 inch by 1/4 inch, and talk about \$50 per LNA 'landed' prices, how far behind would 'single piece receivers' be? Was there a proto-type 'Monolithic-chip' TVRO receiver already operating in Japan? John and I, pooling our joint knowledge, came to the educated conclusion that if there was no such device YET in Japan, we would see one within six months.

The Sat-Tec design philosophy for TVRO receivers has been to shy away from the cute little SAW filter and integrated circuit devices. Whereas firms such as STS have come back with TVRO receivers which are already built around 'IC' type building blocks (thereby eliminating many of the so-called discrete parts; individual resistors, capacitors and transistors), Sat-Tec has opted to continue to use discrete parts. Is that not MORE expensive since there are more parts to handle, more to stock, more to insert into boards, and more to test and analyze?

"No, not if you really know what you are doing" smiles Ramsey. John and his engineers are intra-circuit-analysis specialists. Every part in a circuit is carefully considered for what it REALLY does. If there is a way to combine two parts or three parts into a single part



"THE DEALERS seem to use our receiver as a price-leader to get customers into the store..."

function, they eliminate the needless parts.

"In my mind, TVRO receivers still have to be serviced, by somebody. If something quits or its value changes, we want to be able to say to the service guy 'Change the 100 ohm resistor.' That's a two cent fix. With a receiver that uses custom IC or other specialty devices, a single failure inside of the IC can cost you \$10 to replace even though the failure is typically in a part that only costs a few cents if it is separately priced."

What about reliability? Isn't it true that IC devices have fewer failures than discrete devices?

"Not true. Product failure is strictly a function of product maturity. Every product has failures when it is newly designed. You eliminate failures by sticking with a design and getting ALL of the bugs out. Circuit failure is a combination of design mistakes, and, poor quality control over incoming raw parts. Time eliminates design faults; when you build and ship enough of something, and you stay with the design constantly improving it, eventually you will find and cure all of the design problems. That leaves you with failures caused by inadequate inspection of raw parts. Most of the products in our industry never get beyond the design fault problem solving stage. Before they get the 'bugs out' the company decides to bring out an entirely new receiver, and the process starts new all over again."

And Sat-Tec?

"At the risk of sounding 'old fashioned,' our basic low-priced receiver is nothing but a much refined, later generation version of the unit we first introduced in 1980. The basic design was mature by 1981 or so; what we have done in the interim is constantly re-evaluate the way we make the design work for us."

And pricing?

"I believe we will be able to stay price-competitive at least through this fall. The big market competitors for us right now are the Far Eastern firms that frankly specialize in saving money by using reduced labor rates. I have admiration for the way they conduct themselves, but I do not feel they have any original design abilities. Many of the receivers I see coming into North America are total, carbon, copies of receiver designs we originated perhaps 12 to 18 months ago. They are playing a constant catch-up game. They buy a Sat-Tec or other similar American receiver, such as a Drake, and they take it to Korea or Taiwan where they copy it. The changes they make, to avoid the total-carbon-copy 'look,' are all outside. Or, they might 'flip' the board over (reversing left and right on the circuit board) so the 'copy' is not so obvious.

"In a receiver design that is 'frozen,' or 'mature,' they end up with a model for re-sale here which is perhaps the exact design equivalent to the original they copied. In the case of Sat-Tec, by the time they get back here with the copy, we have gone through a couple of major evolutionary changes on our own. I can look at a copy and tell you within minutes exactly WHEN they bought the 'original' which they used as a copy-reference."

We remarked about a Korean receiver we had seen earlier that week; was John familiar with the one we saw? It looked like an exact copy of the Drake 224; only the front panel had been changed.

"There are, I understand, 3,000 of them now here. I suspect they will end up going to dealers for around \$250 each. Drake won't like that!"

The Drake work-a-like reminded us of John's first confrontation with a Sat-Tec work-a-like. It happened last September during the first Nashville show. Did he remember it?

"I was fit to be tied. I was of course sophisticated enough to realize that Korean and Taiwanese firms don't originate; they only copy. But to see my very OWN engineering work, laboriously worked out part by part between 1980 and 1983, coming back to COMPETE with ME directly was a sobering shock. It took me several months to get over that!"

One of the ways John Ramsey worked that anger out of his system was to join the Korean Air Lines 'shuttle club.' He came close to being on the fabled '007 flight' which the Russians dropped into the drink. He now qualifies for a frequent traveler 'free flight bonus plan' to Seoul.

"This past year has been a real education to me. Let me tell you some stories, to illustrate.

CONIFER IS ABSOLUTELY THE BEST MESH ANTENNA

When Wayne Marong, owner of Harbour Audio/Video in Camden, Maine, saw the Conifer dish for the first time he became immediately attached to it. He knew Conifer's quality and ease of installation was just what he had been looking for.

WHAT IMPRESSED YOU ABOUT CONIFER'S ANTENNA?

"I had been looking at some other types of mesh antennas and Conifer's impressed me as an easier package to get out into the field and install. Of all the mesh antennas it was the best."

WHAT DO YOU LIKE ABOUT THE COLOR AND THE MESH CONSTRUCTION?

"In this market area people like an antenna that blends into the scenery. If the black antenna is backed up against the woods it almost disappears. We also get a lot of high winds and Conifer's antenna holds up well."

WHAT ABOUT WEATHER PROTECTION?

"We're right on the ocean and we have installed several Conifer antennas close to the shore. One is located on the roof of a house and is exposed to salt spray off the ocean. The Polymer coating and the stainless steel nuts and bolts protect it from rust and corrosion."

WHAT ABOUT DURABILITY?

"Conifer's antenna has held up well. I installed one system about 15 miles from the coast. We had a severe ice storm that deposited two inches of ice on the antenna and mount. It was severely iced. There were icicles hanging off the back. Yet, it made it through without coming down or falling apart."

IS THE CONIFER ANTENNA EASY TO INSTALL?

"The ease of installation is what I like best about the Conifer antenna. We actually custom build a mount and install the antenna on a roof. You can't do that with competitive dishes. We can assemble the Conifer antenna in a couple of hours."

WHAT DO YOU THINK OF CONIFER?

"The Conifer people are terrific. They have helped us with all the problems we've had and they are a good company to do business with."

WHAT KIND OF HELP DOES CONIFER OFFER?

"Conifer's new brochure 77 Ways To Succeed In The Home Satellite TV Business can be a helpful tool. And it's FREE too!"

FREE!

Fill out this coupon or send your business card and receive Conifer's "77 Ways To Succeed In The Home Satellite TV Business"

Mail to: Conifer Corp., Box 1025, Burlington, Iowa 52601

Name _____

Company _____

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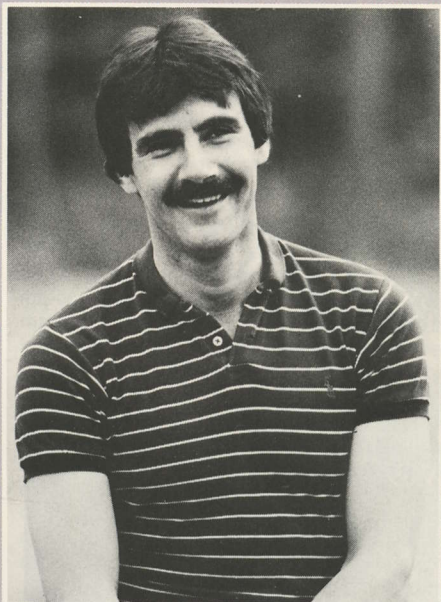
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Wayne Marong

Owner — Harbour Audio/Video
Camden, Maine

"Microwave Specialty Corporation has range tested the (Conifer) AN1200 Micro-Grid twelve foot aluminum reflector with a Polarotor I™ Feed. Test patterns indicate...side lobes of less than 18 db and 1.4° beamwidth will provide normal satellite receive signals. This normal antenna performance would be inclusive of operations at the eventual planned 2° satellite spacings.

Microwave Specialty is an independent test lab having no financial or administrative connection with Conifer Corporation."

Microwave Specialty Company
Duane Tubbs, Chief Engineer



DE-2001
**THE COMPLETE DEALER READY-
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- Range Tested Gain: 42 dB \pm .5 dB at 3.95 GHz
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- Complete System Includes Antenna, Feedhorn, 100K LNA, Motorized Polar Mount, Receiver and Cables
- Full 1-Year Warranty

•Model AN1200C Antenna Available Separately.

PARACLIPSE 16' TEST RESULTS

PRODUCT Of Evolution

There are many well known antenna brand names in TVRO. Some are well known because the firms behind them have excelled for generations in antenna design (for example, **Prodelin**); others are well known because they are heavily and lavishly promoted in the trade press (for example, **Janeil**). Still others are well known because their creators have developed a reputation for assisting antenna installers (for example, **ADM**) and others are well known because of the up-front flamboyant style of their creators (for example, **Hero**).

The first Paracclipse antenna had none of those factors working for it when it held its major introduction to the national US market in November of 1982. We first field-tested a (12 foot) Paracclipse antenna late in 1982 and subsequently wrote about its surprising performance early in 1983. This was our first introduction to a screen-mesh dish which knocked down for ease of shipment into containers two men could handle, using both trussed ribs and circular rib supports to maintain the parabolic shape of the reflector surface. **We were impressed**, and said so.

Others were apparently also impressed because within a year of our introduction to the Paracclipse 12 foot antenna the firm was number two in volume antenna production and pushing hard on the number one volume producer.

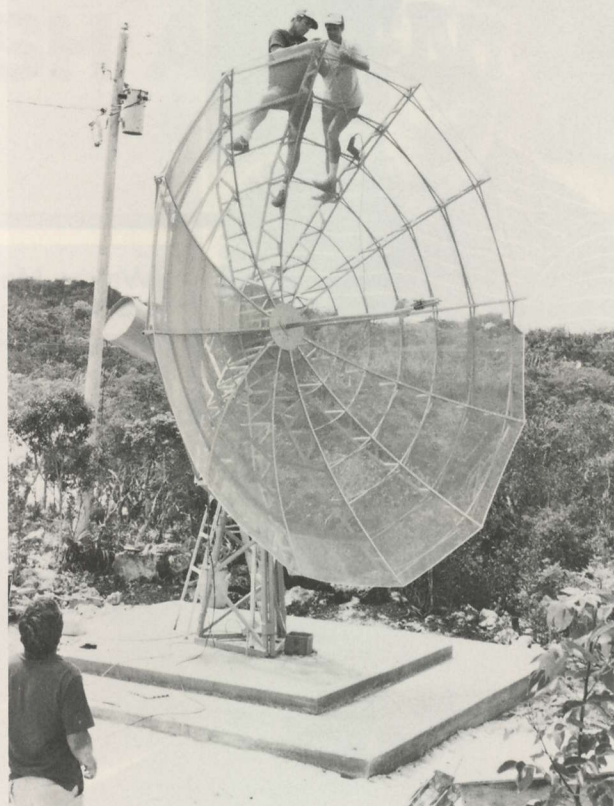
The antenna field is littered with small-volume, 'regional' producers. Anyone producing fewer than say 400 antennas a month must be considered a small volume antenna source and the logistics of moving antennas clear across North America in any volume apparently defies better business practices. Some producers, such as **Odom Antennas**, utilize their own 40 foot trailers to haul hundreds of antennas per shipment to such distant corners as Maine. Others such as **Channel Master**, stock regional sub-distribution warehouses with antenna parts and then depend upon individual dealers to make the last ('short') haul to their places of business. Our **CSD Dealer/Industry Survey** published in the July (1984) issue reported 48 different antenna 'brands' totaling 73 different antenna 'models' at least 'visible' and there are probably half again that many being built in the 50 and down-per-month quantity lots.

Paracclipse antennas (manufactured by **Paradigm Manufacturing, Inc.**) has risen into the 'number one' antenna supplier position in 1984 by combining a dealer-friendly antenna with performance which consistently surpasses other antennas of the same size. And building for the future, a brand-new production facility is now equipped to turn out more total TVRO antennas than ALL of the industry is likely to use for the current month; September of 1984.

This is about the latest antenna in their line-up; a **4.8 meter** dish which has definite 'world class' performance going for it.

The very first Paracclipse 4.8 meter (188 inch or 15.72 feet) dish was installed for the NASA facility at Cape Kennedy; fall of 1983. This antenna was to be used by NASA so their weather people could tap into the transponder 21 (The Weather Channel) service on F3R; a support system for their elaborate weather watch program associated with the Shuttle and other rocket firings from the Cape.

The second 4.8 meter system went half way around the world to Sri Lanka where, as virtually everyone knows, it was installed by a



volunteer crew of U.S. and Canadian TVRO people at the home of **Arthur C. Clarke**. Many expected a 'barrage' of marketing and selling efforts after these first two installations since they certainly had attracted plenty of press and publicity. Surprise; there was no barrage of sales or marketing effort.

In fact, from December of 1983 to mid-year 1984, it was as if the 4.8 meter system from Paracclipse did not exist. In May, however, a third was installed in Nebraska for Creighton University and once again the publicity followed since the University's activities in the field of international television reception have for some years attracted considerable interest.

At the same time the Creighton system was being scheduled for installation, yet another variation of the 4.8 meter was being loaded onto a boat for shipment to the Turks and Caicos Islands. This one would be installed at the CSD/WIV antenna test range facility where it would be given perhaps the most thorough horizon-to-horizon check out possible to date.

The CSD antenna test range facility is unique.

- 1) Because of the geographic location, it is possible to 'see' C band birds in Clarke Orbit from a low look angle of 6 degrees towards the west to an even lower look angle of 3.5 degrees to the east.
- 2) In between those two extremes are some 27 C band emitting satellites, representing domestic birds, international birds (Intelsat et al) and regional birds (Gorizont, etc.)
- 3) The signal levels present from those satellites varies from 'none' to as high as +34 dBW and virtually every gradation in between is in the sky of a regular, routine basis.
- 4) There are more than 20 operating satellite antennas presently operating at three 'range-station' locations on Provo, all of which have known performance characteristics (through careful, long-term measurement and observation).

This is NOT an antenna test range in the sense that there is a test range signal source and a short microwave path across which anten-

na patterns are measured and recorded. This is a REAL WORLD off-satellite test range designed, perhaps by accident or a series of accidents, to be capable of determining with a repeatable degree of accuracy the actual performance of a TVRO antenna system using the Clarke Orbit Belt birds as our multiple signal sources. It was here that the initial 12 foot Paracclipse we tested and evaluated in the fall of 1982 proved itself.

The period of silence, between the NASA/Clarke installations late in 1983 and the mid-summer of 1984 when Paradigm once again began to run trade advertising for the 4.8 meter antenna, was self-imposed by Paradigm's management. Neither engineering nor marketing was pleased with the initial results from the first late-'83 test installations. The NASA installation had been done by Paradigm engineers **Frank Casten** and **Gene Campbell**. They knew that the antenna could be better refined as they assembled the first model and checked out the results. The Sri Lanka installation for Arthur C. Clarke had been done by Paradigm President **David Johnson**, assisted by a Paracclipse dealer from Utah; **David Lyman**. They also, independently of Casten and Campbell, knew the product could be improved. The decision was clear to all involved; the 4.8 meter antenna would not be released to the dealer-public until they were satisfied that the performance had been optimized and the assembly 'glitches' eliminated.

Not all Paradigm dealers and distributors understood this decision. Some, who did, thought the company was going in for over-engineering. **Bill Miller**, operator of Promar Distributing in Tampa, Florida was typical:

"I was not that unhappy with the first model. I knew I could sell dozens of this model in Central America and the Caribbean. I wanted delivery and they told me I would have to wait awhile."

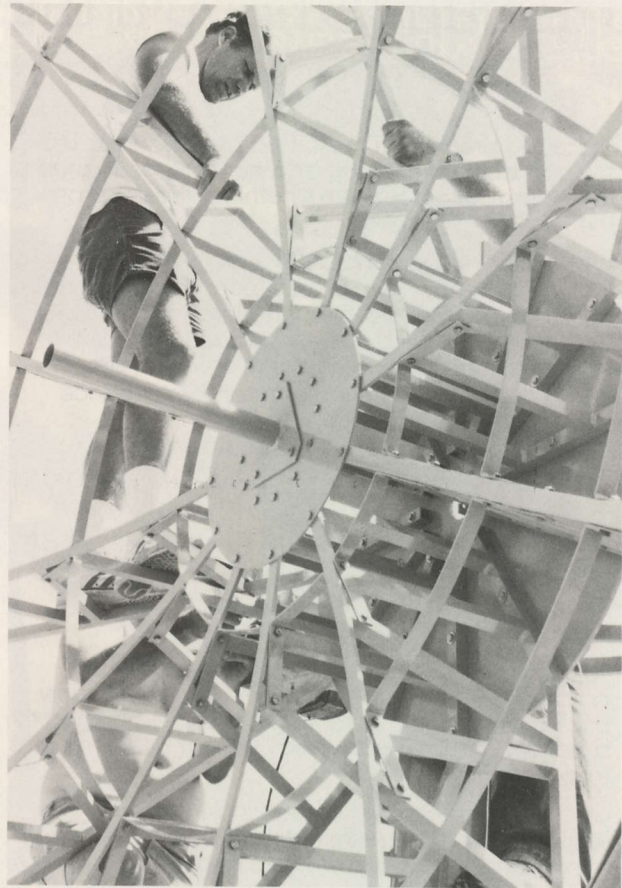
Miller would later reflect, as he saw the performance and data on the final version "This antenna has gross overkill; every single part of it has been designed to withstand far greater forces and pressures than any other antenna in the home or semi-commercial field."

Paradigm's Johnson doesn't think so. He relies heavily on the design and engineering expertise of Casten and Campbell; both old-line microwave engineers with credentials that include prior work experience with groups such as NASA.

Casten on the design.

"The easiest thing to do would have been to simply scale-up the popular 12 foot antenna and accept that bigger surfaces have more slop to them. I would not do that. From the very beginning I wanted this dish and its mount to be so solid that you could work on it or with it just as you would a built-for-NASA solid surface reflector. I have watched people assemble other large-surface screen-mesh type reflectors at trade shows and the ribs and supports all sit there dancing in the breeze like a giant bowl of liquid aluminum jelly. I wouldn't and couldn't put my name on something built like that."

There is nearly a ton of materials in the 4.8 meter antenna and



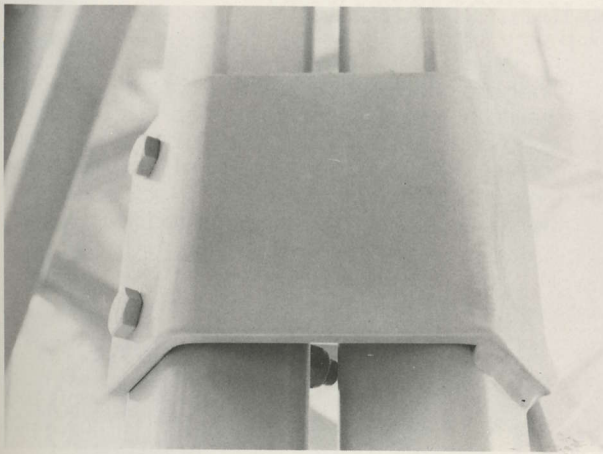
BEEFY FRAME WORK / Gene Campbell inspects the center hub assembly prior to surfacing with mesh.

mount. Half of that weight is in aluminum parts for the reflector and surface. Yet in spite of the considerable 'bill of materials' the antenna assembles in what must be considered a 'reasonable' amount of time.

The Provo test antenna was installed on top of a ridge. We prepared a stair-stepped pad that measured 16 feet by 16 feet on the outer (lower) level and then measured 8 feet by 8 feet on the inner (upper) level. This is not the Paradigm recommended pad (10' by 10' for most locations); we were in an area where the ground is littered with thousands of jagged coral-rock edges and we wanted a space large enough to work around the antenna without endangering those doing the work with the jagged coral rocks. The antenna arrives in multiple five) containers and the first part of the job is to install the base portion of the mount.

Antenna mounts typically are a weak point; especially in 'large diameter' dishes that their creators expect to ship to distant points. Paradigm decided that any type of 'pole mount' was dangerous; not only to the user; of the dish but to the dish itself. So they designed a 'lattice-work' three-sided steel tower which tapers towards the top. It comes in three more or less flat segments and is bolted together on-site to form the support structure. The top of the lattice-work mount (tower) then is fitted with an extremely heavy (as in tough and durable) 'pole-type-mount'; a configuration designed to allow the installer all of the latitude or adjustment ease normally associated with the typically simplistic pole type of mounts.

- 1) The dish, when mounted, can be adjusted for north-south alignment by spinning it free on the pole support portion of the structure;
- 2) The vertical (up and down) 'true' of the support structure, at the top where the dish itself will mount, can also be adjusted to



THREE SIDED lattice-work tower-type base support is steel and heavy!

PERFORATED PERFECTION

Make the break from mesh to a higher quality see-through dish. Take a look at Winegard's perforated aluminum 10-footer. There's nothing else like it on the market.

Winegard's new dish has a sharp, clean look of quality. It's a new level of dish technology offering advantages other see-through dishes can't deliver. Like 39.5db gain, F/D "Deep Dish" ratio of 0.283, lightweight yet rugged construction, super-simple assembly, weather protection, high performance and a look of class that your customers will appreciate. What more could you ask for?

A TRUE PARABOLA

The ultimate goal in designing a satellite dish is to create a reflector that is a "true parabola" - providing "near-perfect" efficiency.

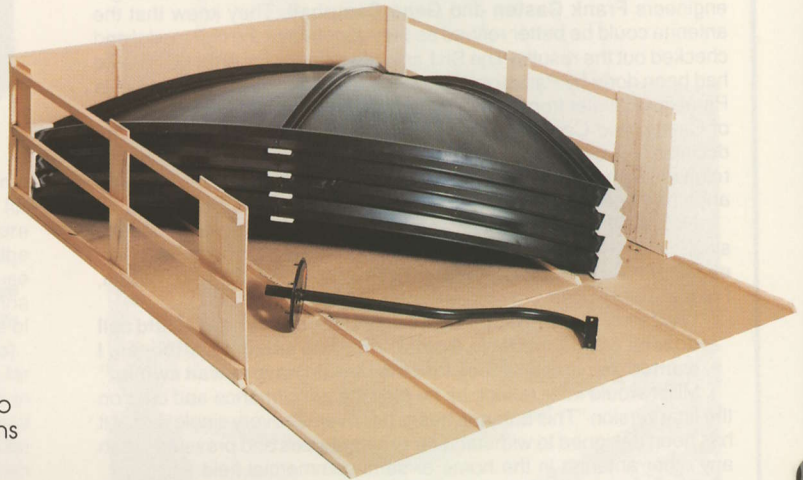
Winegard engineers have developed the truest parabolic dish of any of the see-through category. Each petal, rib and outer ring is stretched-formed to a parabolic shape with specs so tight it took months to perfect the process.

Our exclusive extruded rib and locking system has simplified assembly, eliminating the need for hundreds of bolts, nuts, washers and fasteners. Every time you attach a bolt, screw or fastener to a dish you add another stress point, distorting the shape. With Winegard's extruded rib and locking system, the stress is uniform across the dish, maintaining its true parabolic shape and integrity.

LIGHTWEIGHT BUT RIGID PERFORATED ALUMINUM

Not only is the Winegard perforated aluminum dish lightweight and easy to handle, but it is extremely rugged, durable and well constructed. You can actually see through the perforated petals which are constructed of .040-gauge anodized aluminum. The extruded aluminum main ribs, which provide the basic structural support, are 1/8" thick. The locking ribs are .070" thick and lock the perforated aluminum petals tightly in place. A double-walled outer rim provides an area to insert rim splices at all joints for perfect alignment and additional strength.

Wind-loading capabilities are outstanding with a wind survival rate of 125 mph. And, because the perforation eliminates 36% of the surface area, the dish diffuses solar heat, decreasing amplifier noise.



SHIPPED IN FOUR SEGMENTS FOR QUICK AND EASY ASSEMBLY

Winegard's 10-foot perforated dish is shipped in four quarters. Total weight is only 92 pounds. It's easy to handle and transport. All that's required for finished assembly is fastening the main ribs together with 16 stainless steel nuts & bolts; placing four rim splices into the outer rim; and securing with 8 screws. Just a 20 to 30 minute job for two people.

EIGHT COMPLETE 10-FOOT SATELLITE TV PACKAGES

Winegard offers eight complete 10-foot perforated satellite systems that include antenna, pedestal or post mount, back-up structure, Polarotor I, 24-channel receiver, LNA, wire and a choice of motorized or non-motorized. Available in satin black baked enamel or smoked chrome anodized finish.

Winegard perforated . . . a new standard of excellence.



U.S. Patent Pending

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WINEGARD'S CLEARLY SUPERIOR SEE-THRU DISH



PARACLIPSE 16' / continued from page 11

correct for errors in the leveling of the pad.

All of the hardware is stainless; all of the steel surfaces are taken to bare metal before being primed and coated multiple times with enamel paint.

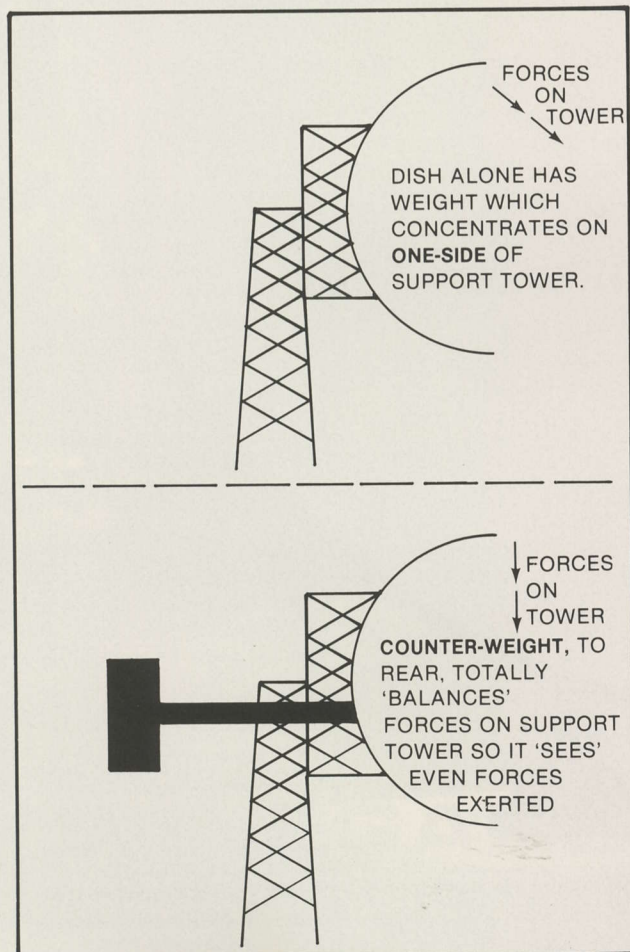
Casten on the mount.

"I didn't ever want to pick up the telephone and have somebody tell me that one of our 4.8 meter dishes in Zanzibar broke apart at the mount. This may be 'overkill' but it is safe-overkill."

Assembly of the mount is a short task of about an hours time for two men. The blue-print drawings are adequate and the parts list is well referenced.

The support structure for the motor drive and the hub for the dish ribs is next. Most of the materials here are exceedingly thick wall aluminum. There has been a skilled use of Teflon bushings and 'shock absorbers' in the rear structure to take unexpected wind loads. The motor drive is especially creative:

- 1) The horizon to horizon coverage is provided by a now-familiar chain drive system. The chain is anchored at both ends, through 'shock absorber bushings' to take any unexpected variations in the chain tension. There are **twin chains** here; **either one** of which would support the **full** dish load should something unforeseen happen to the other. They are separate, but operate 'in parallel' as a safety feature.
- 2) The chains are driven by a shaft which is connected to an appropriate drive line that originates in a hub that mates with many of the common antenna drive/controllers. In other words, you can select a motor drive from practically any catalog you like and it will mate with the 4.8 meter drive system directly. Casten on this feature.



COUNTER WEIGHT at rear (to left) is bucket installer fills with concrete on-site to make sure antenna weights are evenly distributed.

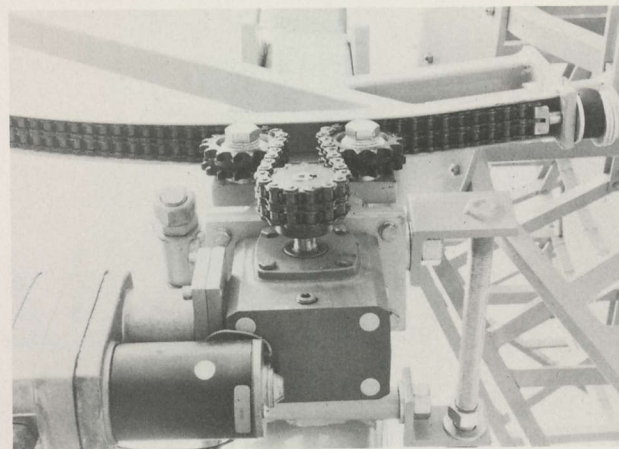
"Customized motor drives, were, we felt, to be avoided. In the entire system, it will usually be the motor drive that fails. When it is a custom package, the user is down for weeks or months waiting for some tiny gear that is only made in Madison. We wanted a completely retro-fittable drive system which any installing dealer could mate with the drive and controller he happened to like,"

The hub assembly follows proven Paradigm technology; a total of 12 separate ribs are positioned in a sandwich-hub that anchors the ribs at both the rear and the front. The ribs are 'trussed' which means they consist of a front-side and a rear side members attached together at multiple points between the pie-shaped front tip and the larger rear wedge with criss-crossed members. Stainless hardware is used to assemble the ribs.

With the ribs assembled, the mount completed, the ribs in place, and the motor drive installed and checked out; you are done except for the antenna surfacing. And two-men have spent the better part of one day getting the dish system to this point.

There is something obvious to the eye which separates this dish system from others in the 'larger-TVRO-antenna field'. **A counter-weight** (balance).

All antennas installed on polar-type mounts must depend upon the rather 'skinny' mechanical connection point between the mount and



DOUBLE CHAIN DRIVE / just in case. Note (black colored) 'shock absorber' at end of chain to right. Uneven chain stresses are compensated for here without causing chain links to 'stress' on their own.

the rear hub assembly to hold the antenna to the mount. In most locations, at most look-angles, this places a significant part of the antenna's dead-weight (ie. load) off to the side of the support (pole, tower, mast, etc.). The support or mount is always unevenly 'loaded' for stress in this situation. In other words, most of the 'dead weight' is concentrated on **one side** of the mount.

Johnson on this factor.

"I had some objections from Casten and Campbell on this feature; they assured me that the mount they had designed (the three-sided lattice work steel tower) would support the dish in any antenna-survival wind without collapsing the mount. I was sure their numbers were correct, but I had also heard horror stories of antennas that came apart because they started to 'buffet' or oscillate when there were combinations of heavy winds and ice loading. I think when you load an antenna such as this with ice, for example, and you have all of the dead weight to the side of the mount, you are asking for trouble. New stresses develop and you could have the antenna 'shake apart' on you, piece by piece, because of the combination of uneven mount loading and everything laying over to one side."

TOP DOWN VIEW —
DOUBLE-CHAIN DRIVE
IS DRIVEN BY VIRTUALLY
ANY AVAILABLE CONTROLLER

COMPRESSION BUMPERS
EACH END

HOW PARACLIPSE 4.8M IS DRIVEN

So Johnson instructed that a 'counter-weight' be added to the antenna; a long arm that protrudes away from the rear of the dish hub. The installer fills that container with cement and when the cement dries he has a perfect counterbalance for the full antenna; the dead weight of the rear container **balances** the dead weight of the antenna; both at opposite sides of the mount structure.

How well does it work?

When the antenna was completely assembled, we took the drive motor off the dish and using our thumb and fore-finger grasped the shaft attached to the chain drive gear box. Using only modest pressure and the tips of our fingers we could rotate the dish on its drive! Obviously this means that a motor drive system for the 4.8 meter Paradigm dish will never be unduly 'taxed' by the weight or forces on the large dish. It all works like a finely tuned watch.

Placing the reflector-surface mesh on the dish rib super structure completes the job. The mesh installs like all mesh on all Paracclipse antennas (9 and 12 foot versions); using stainless clips fashioned like contorted letter 'Js' the task requires two (and preferably three) people. One goes behind the dish and uses Channel Locks or heavy pliers to grab the free end of the clip which a fellow on the front passes through an opening of the mesh. The free, straight end of the clip is then grabbed by the tool and bent around a support member (one of the seven circular supports that go between each of the 12 ribs) and 'cinched up' tight. This is not the most pleasant part of an installation, but it affords the installer a freedom which self-tapping metal screws



REFLECTOR screen mesh material goes on as teams attack multiple reflector panels from front and rear.

do not. **The clips** gives you mobility with the individual screen mesh panels; if you somehow make a mistake and the mesh is cockeyed between a pair of ribs, or if you are sloppy and have a 'pucker', you can correct it far easier with the clips than you can with a set of self-tapping metal screws which have already been bound into place.

The job is completed by running trim pieces along the top of each rib (they are held in position with rivets applied with a hand rivet gun), and attaching the feed.

The feed is for the .3 f/D of the dish. It is not simply a Chaparral feed with a center insert. Paradigm has recently completed a series on developmental tests evaluating various feed configurations for both their 9 foot and 4.8 meter antennas. Both were designed for .3 region feeds. They have come out with a 'modified feed' which they feel outperforms the standard Chaparral-with-.3 'Golden Ring' insert although it begins life as a Chaparral none the less.

The feed support is in the center-of-hub button-hook family. It is attached or anchored at the hub plus at three 'tie-down' or guy-wire points around the dish circumference. The installer can center and adjust for maximum signal from the rear of the dish totally.

FIELD Testing

Between the first day's effort getting the mount and super structure ready for the mesh reflector surface, and the placing of the mesh on the dish, there is the better part of two working days for two people. This assumes the appropriate base is in place in advance.

We doubled up on the screening exercise because we had done that before, and stretched out the tuning exercise because in this case the performance of the antenna was to be critically analyzed.

Paradigm's Gene Campbell is one of those purist engineers who never watches satellite television at a dish installation; at least not at



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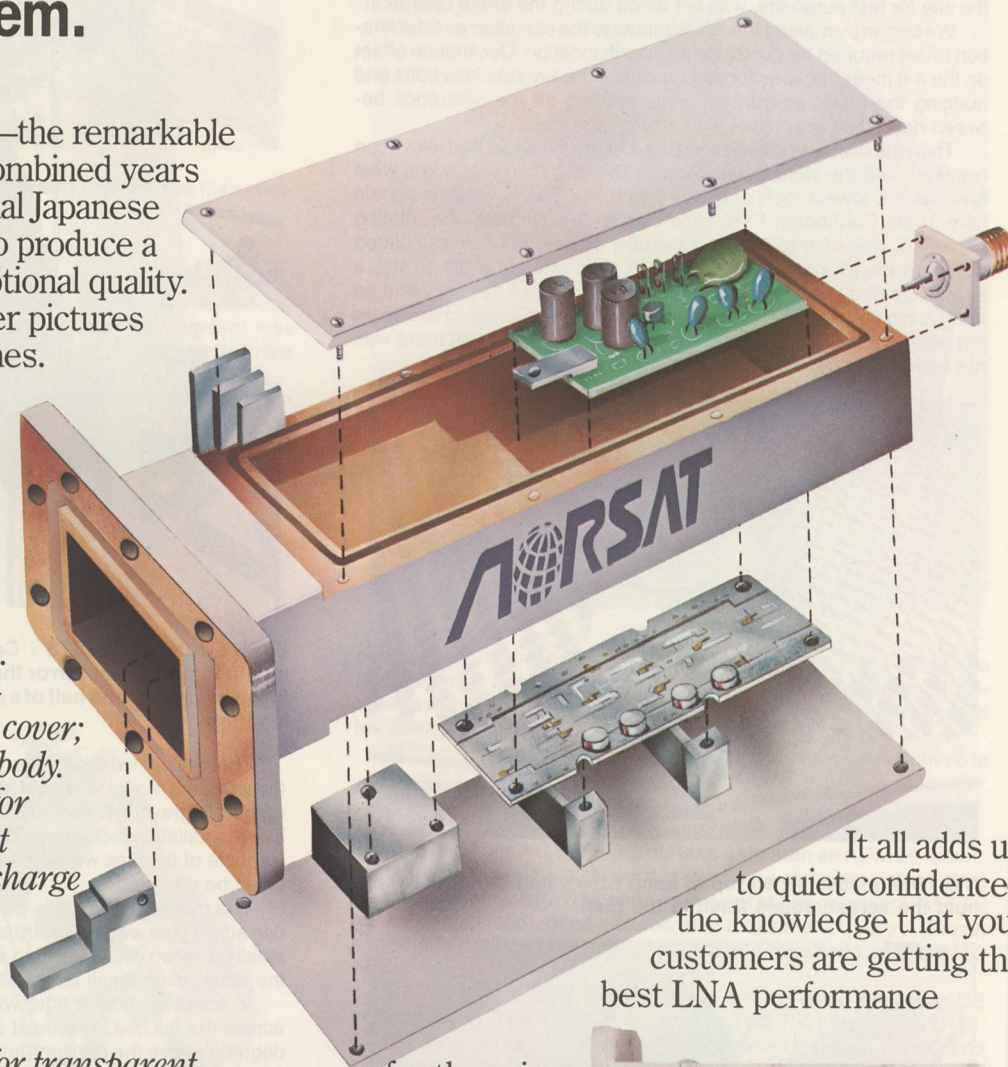
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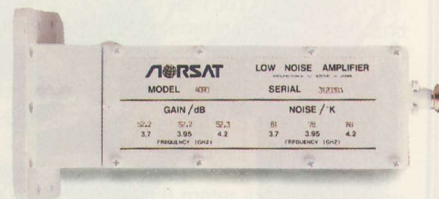
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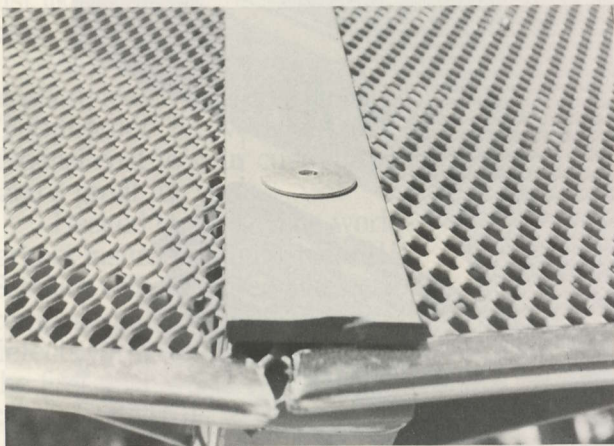
NORSAT

PARACLIPSE 16' / continued from page 15

the dish proper. He feels strongly that people who use receiver signal level meters and TV screens for dish tracking and peaking are usually fooling themselves; badly. He opted to bring to the site a \$20,000 piece of test equipment which he pressed into service as soon as we had the feed in place. His approach is to use a spectrum analyzer (allowing him to see the full 500 MHz bandwidth of the satellite spectrum from 3.7 to 4.2 GHz) and a power meter, as required, to determine whether changes in antenna tweaking have improved or degraded the system performance. A television receiver, brought to the site for test purposes, was left alone during the entire operation.

We began by making the adjustments to the elevation and declination offset required for our 22 degree north location. Declination offset on the 4.8 meter requires loosening a set of heavy stainless bolts and nudging the offset adjustment while reading off the difference between non-offset and offset with a precision tool.

Then the dish was moved towards a high look angle bird, elevation tweaked, and the signal levels noted. The dish then was taken west towards the lowest look angle bird with reasonable quality signals here in the Caribbean; F1R. Now Casten fine tweaked the rotating portion of the dish-to-mount assembly to re-peak our calculated **north-south** alignment; and the dish was brought back to not a straight up bird but rather to the far eastern portion of the sky and an Intelsat bird located at 18.5 degrees west. Again, Casten checked on the north-south alignment and we found an indication that there was not complete tracking from **far west** to **far east**.



RIB TRIM pieces sit on top of each rib (riveted into position) and hold the screen edges flush to the dish.



GENE CAMPBELL reads out the relative performance numbers as the dish tracks from horizon to horizon. No TV set for Gene!



EVERYTHING ADJUSTS / Casten compares angles on top of mount to find a small error that caused horizon to horizon tracking to be off perhaps half of a degree. He found and corrected it in minutes.

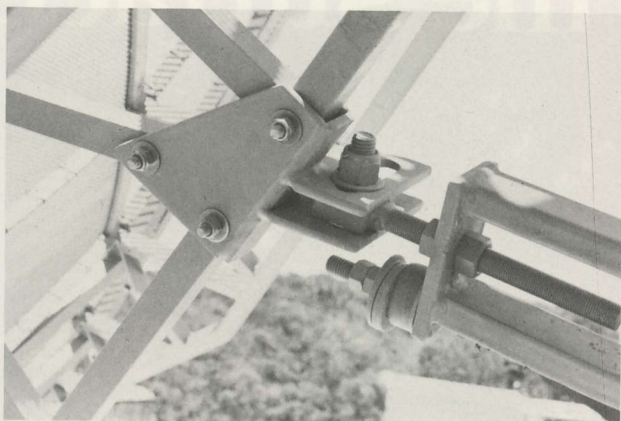
That's when we determined we should recalibrate the true-ness of the top of the mount; it should be straight up and down (ie. vertical with respect to gravity). It was off a fraction of a degree due to a small error in the installation procedure. The mount is ready for such errors and in a couple of minutes we were now true up and down and the process could be repeated.

The mount assembly is particularly dealer friendly because you can adjust your way out of virtually any installation error. Our error was small but when you are asking a dish to track 'true' from one horizon to the other, even small errors can cause big tracking problems.

In about an hour's time we had the dish tracking **totally true** across the full belt. The most eastern bird to be seen is less than 4 degrees above the horizon (Intelsat at 1 degree west) while the most western is RCA Alascom at 143 west. That gives us 142 degrees of Clarke Orbit belt which the 4.8 meter tracked.

There are many mounts (well, several) which make **the claim** for horizon to horizon capability. We have tested virtually all of these and for antennas 15 feet in diameter and larger, the mount system designed by Frank Casten and the crew at Paradigm is the **ONLY** mount and drive we have tested which does exactly that; from 0 degrees look angle on one side to 0 degrees look angle on the opposite side. In fact, it will even dip a couple of degrees below 0/0 if you wish.

Making a horizon to horizon mount that tracks, true, across the full arc, does not seem like it should be that dramatic an engineering problem. Casten and crew will probably receive no 'awards' for being **the first to really** do so; but for dealers who have installations where some of the desired birds are below say 15 (or 10) degrees look angle on one or both sides, we advise you to get written confirmation that the mount plus dish you are considering will in truth reach down to these

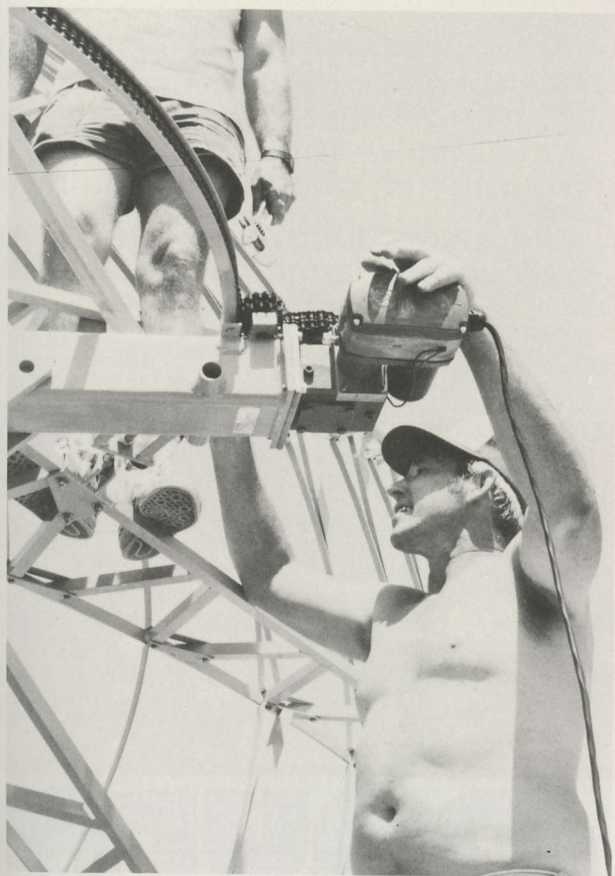


HARDWARE IS STAINLESS but there can still be rust (see comments).

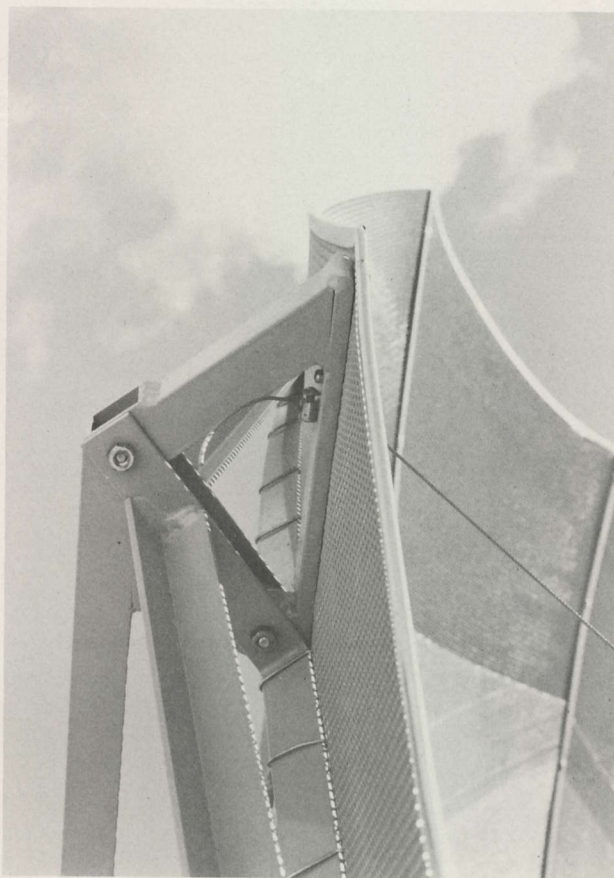
lower look angles before planning a system.

We initially equipped the dish with a 100 degree (Drake) LNA and an Avcom 2 series receiver. Tests were run across the full belt and then an Avcom switchable **half** and full **transponder** receiver was added to check out the video quality on the Intelsat grade birds in the eastern sky.

The one thing we cannot do is give you a certified antenna-gain (or G/T) number. Our range is a practical range, not a hard-number reference range; as we have repeatedly said. What we **can** do, and do



VIRTUALLY ANY QUALITY controller/motor will combine with the 4.8 meter so the installer has many options when selecting motorization.



perform on a routine basis, is side by side comparison checks of one (test) antenna against another (test) antenna. That gives us 'traceable' results from which we can evaluate the overall performance of the antenna. Here is what we found:

- 1) The 4.8 meter Paraclipse has performance which is within 0 to -0.2 dB of a USS 16 foot high surface quality fiberglass dish;
- 2) It has from +2.2 to +2.8 dB **more gain** than a 12 foot Paraclipse;
- 3) It has from -0.9 to -1.3 dB **less gain** than an ADM 20 footer.

In the real world we found that we had watchable pictures and good audio from such exotic birds as Intelsat at 1 degree west (AFRTS feed; Portugal feed), good pictures from Intelsat at 21.5 west (Brazil) and superb pictures from Intelsat at 31 west (Venezuela, et al) and 53 west (Mexico).

We do a great deal of comparison testing using the three US network feeds (NBC/TR8 on F1R; CBS/TR2/T301 and ABC/TR10/T301). These three 'channels' are much desired in the Caribbean and with the possible exception of NBC on F1R they are usually laced with some amount of sparklies and audio noise in even our 'favored' portion of the Caribbean. All three are perfect (from no sparklies at all on NBC to just an occasional 'hit' on CBS and ABC) on the 4.8 meter antenna.

REGULAR Use

We elected to install the Paradigm 4.8 meter in a test location where an existing (13') ADM antenna has provided good service for several years. We wanted the antenna to have 'heavy-daily-use' to speed up any failures if they would occur. The particular (Ward) location is a family of heavy television viewers and any dish installed here is busy from sun-up to midnight. **There have been no failures** in the first six weeks of use.

We see this antenna (going to the dealer/distributor in the \$4,500 region; exact pricing depends upon quantity ordered) as being the

PARACLIPSE 16' continues on page 22

Look Beyond the Surface!

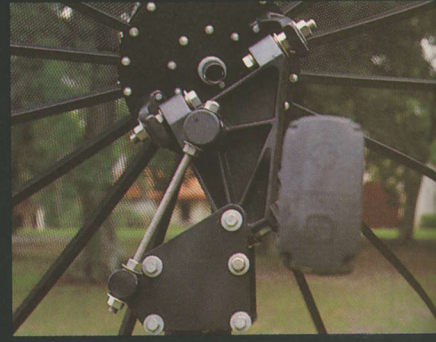


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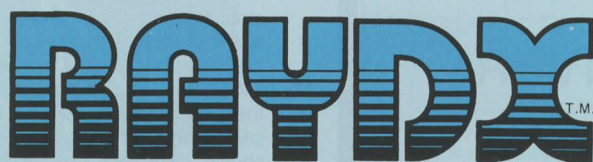
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Cartwright Communications 7812 Red Sky Drive, Cincinnati, OH, 45249, 800-543-8614, OH Watts 800-582-2641.

Echosphere Corp., 2250 S. Raritan, Bldg. A, Englewood, CO, 80110, 1-800-521-9282, Eastern 800-223-1507, Western 800-338-5477, CA: 800-338-5478.

Eclipse Electronics, Inc. 1739 28th Street S.W., Wyoming, MI, 49505, 616-538-7148.

International Video Communications Corp., 4005 Landski, North Little Rock, AR 72118, AR: 501-771-2800.

Mid American Telecommunications, 420 North Lancaster, P.O. Box 629, Hesston, KS, 67062, 316-327-4243.

National Microtech West, Inc., 510 29½ Road Grand Junction, CO 81504, 1-800-223-8967, 800-321-2417.

National Satellite Communications, 21 Century Park, Clifton Park, NY, 12065, 518-383-2211, 1-800-821-8659, NY Watts: 1-800-522-3538.

National Satellite Communications, 10779 Satellite Blvd., Orlando, FL 32821, FL: 305-851-4738, FL Watts: 1-800-821-8659, Out of FL 1-800-322-4044.

Precision Satellite, Inc. 715 Grove Street, Clearwater, FL, 33515 1-800-HOT-DISH or In FL 813-441-9438.

Quarles Satellite Systems, 1616 Calhoun Road, Greenwood, SC, 19646, In SC 1-800-922-9704 or Out of SC 1-800-845-6952.

Spectrum Satellite 3200 Sunnyside Avenue, Burlington, IA, 52601, 319-753-0176, In IA 800-582-0200.

Universal Satellite 3050 Territorial Road, Benton Harbor, MI 49022, 616-925-0143, 616-926-1939.

Vess Distributing 25 Lower Street, Buchanan, VA, 24066, 703-254-1775, 1-800-368-1314, In VA 1-800-572-3161.

PARACLIPSE 16'/ continued from page 19

'ultimate TVRO dish' for the totally dedicated videophile in North America. The common-sense approach to integrating the horizon to horizon drive to virtually any quality controller and motor product makes it dealer attractive. Married to a high quality receiver and controller, it will do anything the user wants done, better, than any similar sized antenna on the market today; from horizon to horizon.

Paradigm sees the product as 'exportable' and has in fact already received a bushel-basket of mail from off-shore installing firms. Because it knocks down into manageable containers for shipment, it will indeed go off-shore with relative ease. The antenna should do especially well in the Caribbean and Central America where multilingual viewers do not find it cumbersome to jump from English to Spanish or Portuguese at the push of a TVRO button.

We equipped our test model with a 'teflon slab' to adapt the feed to right hand circular polarization. This certainly improved the Intelsat and Gorizont signals (which are RHC) but there was a performance loss for the linear polarized signals from the domestic birds. Years ago we worked out a solution to this problem; you install **both** a mechanical rotor (such as the tried and true Alliance U-100 rotor) to rotate your full feed plus LNA, install a Polarotor to switch polarizations between discrete vertical and horizontal, and install the slab for RHC (or LHC). This makes it possible (but very cumbersome for a typical viewer) to have optimized performance on linear vertical, linear horizontal, RHC or LHC polarization by working between rotation of the full feed (and slab) and the polarotor continuous tuning. You simply 'rotate' the slab out of the way for discrete polarization and rotate it back when you need it for RHC or LHC.

This is not an option, at the moment, with the Paraclipse 4.8 meter since there is no suitable way of mounting the mechanical (Alliance or similar) rotation device at the end of the button hook feed. In short, a system that will provide push-of-button optimized reception on all three formats still requires a fair amount of custom engineering, and operational expertise.

The Paraclipse 4.8 meter is the finest antenna package we have tested; and that includes all 20 + of the present operating antennas on the Provo range and another half dozen or so that have failed and been taken down here in recent months and years. There is

more to any suitable dealer-friendly and consumer-friendly antenna system than sheer, bulk gain the moment the antenna is first tweaked and handed over to the customer. There are things such as attention to assembly detail (and the providing of adequate instructions), attention to antenna peaking detail, attention to finish and the ability of the antenna to take a pounding from wind, rain and snow and still keep on performing. This antenna has excellent performance but it is a hands-down winner in the 'detail' department.

Paradigm did something quite unusual when they elected NOT to push the antenna for its heavy promotional value shortly after the Arthur C. Clarke terminal had been installed. They had a 'roll going' at that time and could have built up a tremendous order base just on the strength of that (and the first NASA) installation. They chose not to do so because they were not internally satisfied with the 'detail' of the product. That extra six months they took to work the 'detail' out shows and others who think they are in the TVRO antenna business for 'the long haul' would do well to approach their own antenna product designs with the same conscience.

Good job, Paradigm. Now . . . about that 25 footer we discussed.

Comments:

At the time of installation, only one part of the operation caused us to wonder "isn't there a better way to . . .". The declination offset is set by adjusting some brackets in a slot. The antenna's own weight and the position of the antenna required to make this adjustment properly works against you as you do this. Johnson also noticed it and we would not be surprised to see some change made in this mechanical adjustment procedure. **It is a ONE TIME adjustment, made only when the installation is done**, but it does need to be done properly, or tracking accuracy will suffer.

Six weeks after the installation, while we were on a routine inspection visit, we noticed a couple of rust stains on top of the brown enameled finish. We located the rust source. The stainless steel bolts were holding up OK but some that were plated rather than solid had been nicked by wrenches and other tools when they were installed. Those nicks bared the non-plated steel below and it had begun to rust. Naturally in a lifetime, permanent installation you don't want ANY rust to EVER get started. Greater care when installing the dish, or something other than a plated-finish piece of hardware is suggested.

RF RECEIVER DESIGN/ UHF IF SAWS

In the August issue of CSD, designer engineer Hinkle described the trade-offs involved with selecting of the TVRO receiver IF or intermediate frequency. This month he discusses how you obtain good wide-bandwidth response using relatively new UHF region SAW filter devices.

by
Terry Hinkle
RFMonolithics, Inc.
4441 Sigma Road
Dallas, Texas 75234

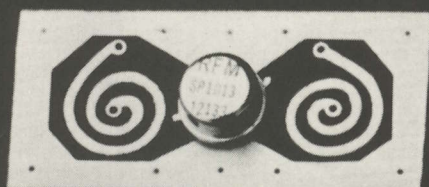
INTRODUCTION

Current satellite receiver performance is typically limited by a few key components. One of these is the bandpass filter in the receiver IF strip. The function of this filter is to pass the desired signal with as little added distortion as possible, while rejecting other satellite channels and external noise. Depending on how the system is configured, TVRO IF filters are in either the VHF or UHF frequency band. Since the same bandwidth is required in either case, the actual IF frequency can be the dominant factor in determining the optimal filter technology choice. UHF/VHF filter technologies, TVRO filter requirements, and SAW filter performance and application information are discussed here.

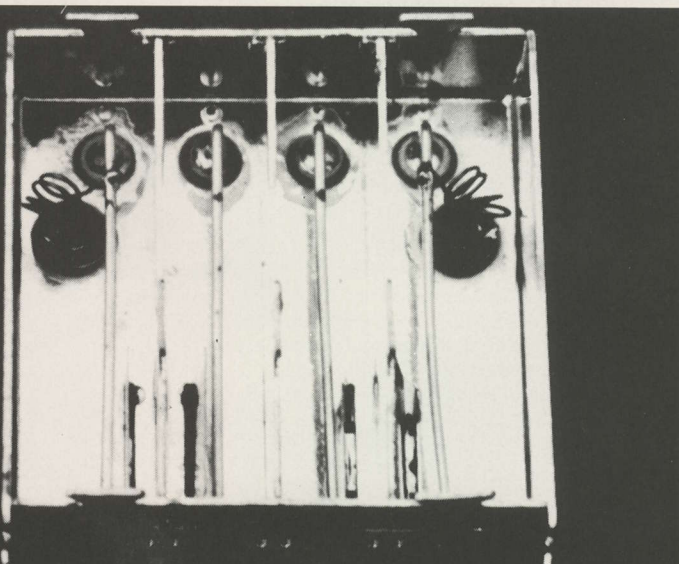
UHF/VHF FILTER TECHNOLOGY

UHF and VHF bandpass filters are available from several sources utilizing various technologies. Resonant cavity filters produce a satisfactory response with low insertion loss but suffer performance degradation over temperature and vibration. These filters become large for applications requiring a sharp cutoff (anything beyond 2-3 poles). Cavity filters also take excessive time to align in production. **Figure 1** shows a 3 section cavity filter at 612 MHz beside a 612 MHz low-loss SAW filter. The frequency response of each filter is shown in **Figure 2**. Notice the insertion loss of the filters are comparable but the SAW has a much sharper rolloff. The UHF SAW filter has better performance and is cost competitive in production quantities.

Other filters commonly used in TVRO systems are implemented with discrete components. These lumped component (L/C) filters are useful for prototyping work and low volume applications as it requires little time and money to change the filter response. They are, however, about **twice the cost** of an equivalent UHF SAW filter in production quantities. **Figure 3** shows the magnitude and delay response of a



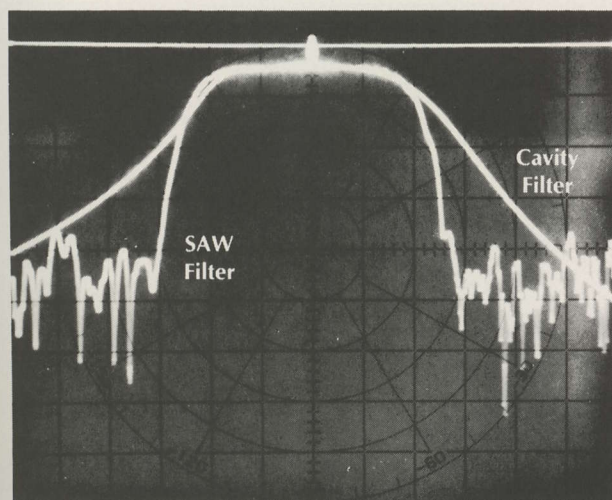
UHF SAW Filter
(on circuit board)



UHF Cavity Filter

SAW FILTER vs. cavity filter; a physical comparison (figure one).

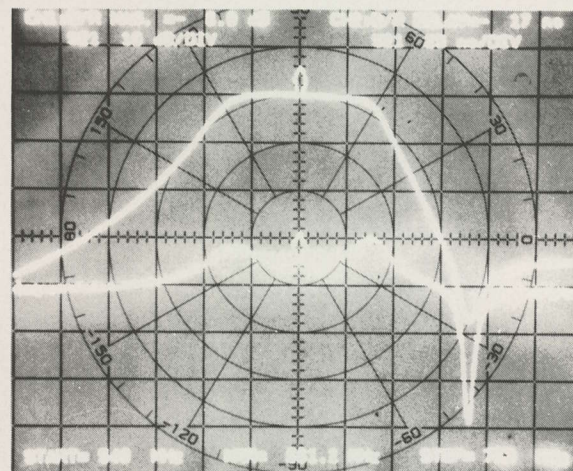
UHF TVRO L/C filter. This filter has a wider bandwidth than is optimal for a TVRO receiver. The rolloff is also less than is desirable for the application. This filter is shown along with a UHF TVRO SAW filter in **Figure 4**. As is apparent in the picture, the SAW filter is much sharper with about the same insertion loss. If this L/C filter had the same bandwidth as the SAW filter, its insertion loss would be **substantially** more. If the L/C filter also had comparable sharpness to the SAW filter the phase perturbations at the band edges would be much larger, thus degrading the overall phase response significantly.



SAW FILTER (lower trace) vs. cavity filter (upper, smoother trace) response pattern at 612 MHz (figure two)

SAW FILTER TEMPERATURE CHARACTERISTICS

The temperature performance of a SAW filter is determined by the substrate material used. Quartz is the most temperature stable of the three common piezoelectric substrates **but** has the lowest coupling coefficient and thus yields the **highest insertion loss**. Lithium niobate has the highest coupling coefficient of the SAW substrates but



660 MHz + 120 MHz

UHF (660 MHz) type of L/C filter response (figure three)

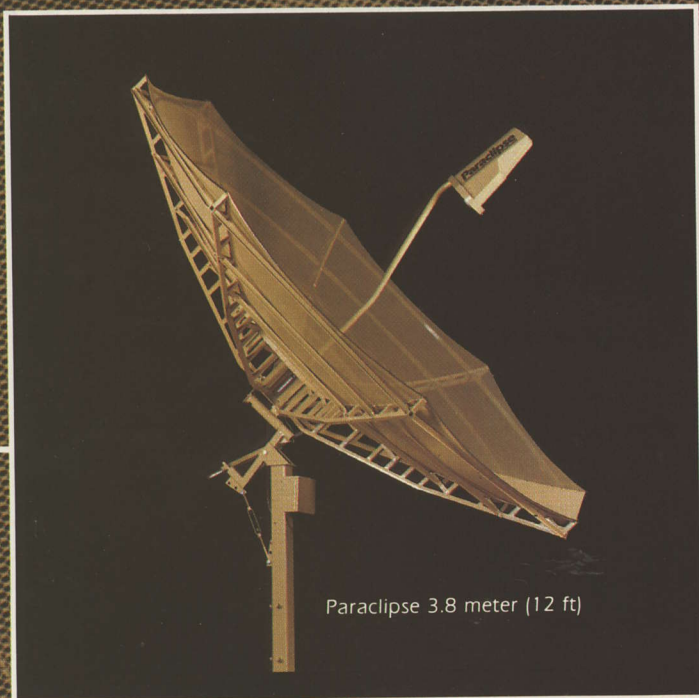
the velocity decreases 93ppm/degree centigrade. A filter's center frequency varies over temperature as the substrate's velocity changes. A 612 MHz SAW filter is shown in **Figure 7** over a 0 to 70°C temperature range. This is far more what an indoor environment will provide, but it is representative of many average outside environments. However, if the operating temperature range exceeds this, a 30 MHz filter should be considered (ML1014). An IF filter that is frequency misaligned with the incoming signal and detector will roll off one side of the FM energy resulting in degradation of the system differential gain and phase.

UHF SAW FILTER MOUNTING AND INTERFACE CONSIDERATIONS

Two important considerations in using a SAW filter are the printed

TVRO FILTERS/ continues on page 26

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The term 'tuned feed' is a familiar, and frequently misused phrase in the satellite antenna industry. The theories behind the tuned feed concept are well tested and are proven to be sound. Its meaning is rather broadly interpreted and the appropriateness of its use is not always apparent. The question as to whether you actually get a tuned feed with a particular antenna is debatable.

We hope you will spend a few minutes reading this ad. Perhaps it will clear up some of the mystery about tuned feeds and allow you to draw your own conclusions.

A Measure of Performance

An antenna's performance is determined by how cleanly it can amplify the microwave signal (expressed as gain), without amplifying unwanted signal contamination (expressed as noise). Since noise is always present to some degree, it must be considered as part of the performance equation.

Greater gain, lower noise, means better performance. This equation of signal gain over noise temperature: G/T , is an antenna's measure of performance.

Feedhorns in General

Each feedhorn configuration is engineered to have an ideal focal length over antenna diameter ratio (F/D), where its optimum performance is achieved. Operation under any conditions other than these 'ideals' will result in a loss of performance.

Antenna manufacturers, with varying degrees of success, design

their equipment to conform to these constants. Each antenna manufacturer must base his choice of feedhorn on how closely its specs match the requirements of his antenna.

The result is that today's market offers literally hundreds of antenna designs that differ in shape, size, surface, parabolic symmetry and focal length over diameter ratios, while there are only a few different feed configurations available to choose between. This inequity creates a situation where some compromise in performance is impossible to avoid unless you have a true tuned feed.

Illumination, Over, Under and Perfect

If the antenna F/D ratio is flatter than the feedhorns optimum focal length over diameter ratio, or the feedhorn is positioned beyond the perfect focal length, over-illumination occurs. The result is a poor picture due to the excessive noise picked up from the perimeter of the reflector.

If the antenna F/D ratio is deeper than what the feedhorn is designed to accommodate, or the feedhorn is positioned short of its ideal focal length, under-illumination occurs. The result is wasted signal, a weak picture and poor performance from too little gain.

For the feed system to properly illuminate the parabolic reflector, it must be positioned at the exact focal point where the microwave signals reconvene. For maximum efficiency, the feedhorn F/D ratio must be tuned to match the antenna F/D ratio exactly.

In the recent past, all you needed was a pretty good antenna and enough savvy to choose the right feedhorn. If you could demonstrate a picture, you sold equipment. If you sold equipment, you were in business.

At Paraclipse we think higher performance is everything, and we build our antennas accordingly. We've incorporated some subtle but important changes in the specifications of our feedhorns and have realized a significant reduction in antenna noise temperature.

After extensive research and development, range tests prove a 33% reduction in antenna noise temperature for the 2.8 meter Paraclipse and a 32% reduction for the 3.8 meter Paraclipse with the new tuned feed systems. Our focal length/diameter ratios are mathematically perfect and each feedhorn is truly tuned to properly illuminate the antenna reflector it comes with.

The new optimized feed system derives maximum signal strength with a minimum of noise. The result is a stronger, cleaner picture from even the weakest transponder, with greater gain and less noise. The only thing that has stayed the same is the price.

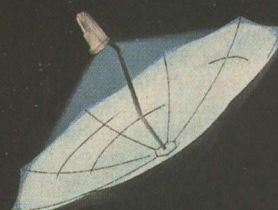
And to top it all off, we have a handsome new weather shroud that is molded in special Paraclipse colors. The new hood is made of tough, ultraviolet stabilized ABS plastic. It will protect the sensitive electronics from the long term effects of sun and weather, and it will identify your equipment as genuine Paraclipse.



Over-Illumination: Excessive noise enters the feed system from the perimeter of the antenna and shows up as sparklies.



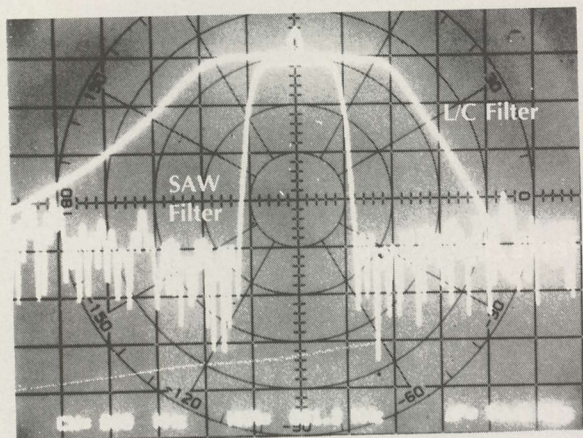
Under-Illumination: A poor picture and an inability to monitor a weak transponder. The signal is attenuated and there is too little gain for good performance.



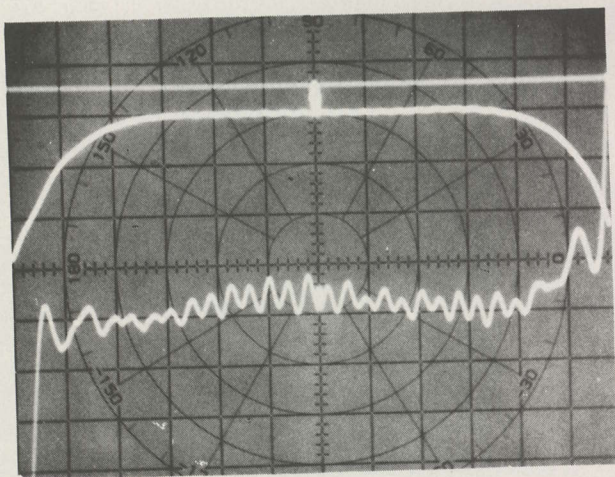
Perfect Illumination: The feedhorn F/D is tuned to exactly match the F/D ratio of the antenna. Full and clean illumination of the entire reflector. A strong, bright picture.

TVRO FILTERS/ continued from page 23

circuit board layout and SAW package grounding. At UHF frequencies an improperly grounded SAW package or poorly routed input/output lines can result in unacceptable device and system performance. The layout in **Figure 6** has the input and output SAW package grounds routed directly back to the source and load respectively. The package also **must** be grounded to the top side ground plane (preferably at the tab). If printed matching is not used, care should be taken to keep the input and output inductors from coupling to each other.



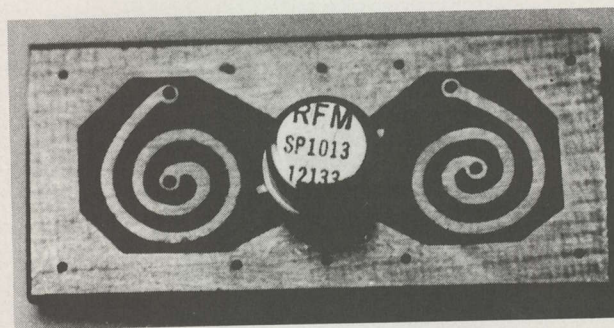
L/C FILTER (upper trace) versus saw filter (lower trace) at 660 MHz (figure four)



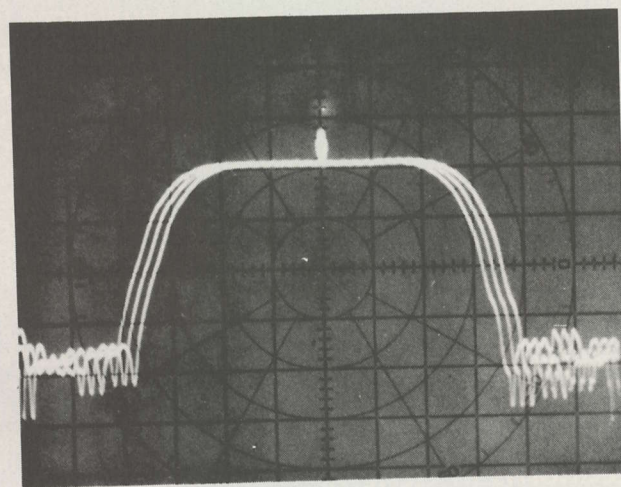
± 10 Nanosecond delay over passband (figure 5).

SAW filter performance is degraded somewhat when terminated by severely mismatched source and load impedances. For example, if a SAW filter is connected directly to a **mixer** with 6:1 VSWR, the phase of the incoming signal could be distorted enough to degrade system performance significantly. To avoid this, the devices surrounding a SAW filter should have 3:1 or better VSWR's. Many times the characteristic impedance of a SAW filter is designed to operate at a value **other than 50 ohms** to better accommodate adjacent system components. Since SAW's are not inherently 50 ohms, other characteristic impedances are usually not a problem.

Since a SAW device is a long delay component (300-500 ns), IF strip design and layout are critical. If a portion of the IF signal bypasses the SAW filter and enters the FM discriminator, it will interfere with the desired (delayed) signal **causing video distortion**. This effect is seen in the system differential gain. This is usually not a problem if the **gain** on the IF board is **restricted to 60 dB or less** and good RF layout



TYPICAL 612 MHz saw filter network with etched inductors (figure six).



SAW FILTER vs temperature stability in 0 to 70 centigrade region (figure seven).

techniques are used throughout.

TVRO SAW FILTERS

SAW filters are currently made for the TVRO industry at both UHF and VHF frequencies. The ratio of bandwidth to center frequency (fractional bandwidth) of a SAW filter often sets performance limitations for the filter as well as the entire TVRO system. If IF filtering is done at 70 MHz, a 30 MHz bandwidth results in a 43% fractional bandwidth. SAW filters perform efficiently up to about 20% fractional bandwidth when built on high-coupling piezoelectric substrates. SAW filters with excessive fractional bandwidths are lossey and usually have poor amplitude and phase performance in TVRO systems. Considering performance, size, and cost, TVRO SAW IF filters are **better implemented at UHF frequencies** than VHF frequencies.

One of the most important considerations in using a SAW filter in a TVRO receiver is performance. If a 70 MHz **high-loss** SAW filter is used, the amplitude and phase ripple must be traded off with insertion loss to meet TVRO differential gain and phase requirements. Many times, high-loss SAW filters will be deliberately mismatched to **25 dB insertion loss** to help meet the desired amplitude and phase performance, as lower loss would result in triple transit signals interfering with the main response. The direct feed signal (crosstalk) must also be 45 to 50 dB below the desired signal level at the output of the filter to be consistent with the ripple caused by triple transit. This requires crosstalk attenuation of 70 to 75 dB for a high loss SAW filter. Any SAW filter in a TO-8 package inserted into standard G-10 circuit board will have difficulty maintaining 70 to 75 dB of crosstalk isolation at VHF/UHF

frequencies. On the other hand, loss-loss SAW filters will provide excellent amplitude and phase ripple performance with 5 to 7 dB insertion loss as the triple transit signal is suppressed by matching and the direct feed signal only needs to be 50 dB below the signal input.

The input impedance of a SAW filter is determined primarily by the required fractional bandwidth and the substrate material used. With a high coupling substrate material such as lithium niobate, a UHF low-loss SAW filter will often achieve 5 to 6 dB insertion loss and ± 10 ns delay ripple over the 1 dB passband with a fixed inductor on each side (Figure 5). SAW filters are repeatable enough unit to unit to allow fixed matching in many applications. The inductors shown in figure 6 are approximately 35 nonohenries each.

CONCLUSION

Current TVRO receivers primarily use three different technologies for IF filtering. There are advantages and disadvantages to each type. For medium to high volume applications, low-loss SAW filters are the best overall choice for UHF TVRO requirements. The best performing and most cost efficient TVRO systems of the future will make use of UHF IF frequencies and low-loss SAW filter technology. Previous hardware limitations requiring VHF (70 MHz) IF frequencies are no longer a restriction as gain, filters and FM demodulators are available at UHF frequencies for the same cost as at 70 MHz. Thus the overall system performance can most times be improved and receiver hardware cost reduced.

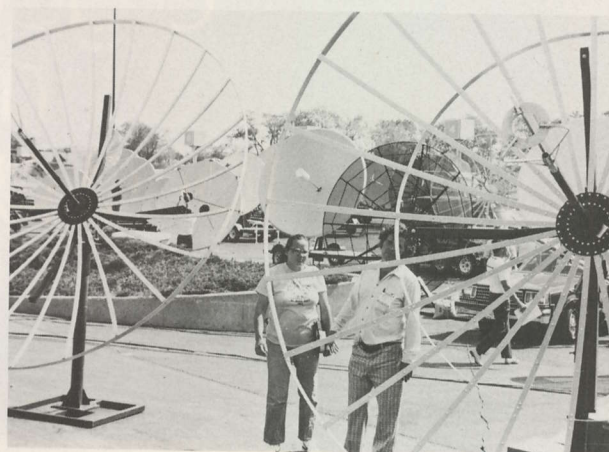
RIP VAN WINKLE AWAKENS TO NIAGARA FALLS SHOW

Editor's Note: Jim Vines is a modern day 'Rip Van Winkle.' He was a part of the industry at its founding, and prior, building wire mesh dishes for UHF TV reception from 1977 onward. He introduced his first solid surface TVRO (4 GHz) satellite antenna at the Oklahoma SPTS in August of 1979. He also attended the next industry seminar, in Miami, Florida in February 1980. After that Vines dropped out of the mass production world and concentrated on building TVRO antennas (up to 7.6 meters in size) for locations scattered from Central America to the Arctic Circle. He has attended no industry trade shows in the interim and his only exposure since February of 1980 to the industry's products has been through CSD and his occasional brush with a home TVRO system. When we found Vines at Niagara Falls, we thought it might be interesting to ask him to walk the antenna lot, and tour the booths, to get his impressions of what has happened to 'his industry' in the interim 4-1/2 years. Jim's observations are published here.

GOOD Grief! What Have You Done To MY Industry?

Five years ago under a blazing Oklahoma summer sun this observer joined other industry pioneers Tay Howard, Robert Coleman, Tony Bickel, John Kinik, Andy Hatfield, Royden Freeland and Paul Shuch at the first-ever private terminal seminar. The event was christened 'SPTS '79' by Bob Cooper who, over two years prior, had forseen the possibility of a home TVRO industry. With just eight exhibitors and 500 attendees, the first show was more a meeting of 'engineering visionaries' than of corporations bent on creating a new electronics industry.

The South Oklahoma City Junior College auditorium was packed as one 'pioneer' after another described various aspects of the rapidly emerging new technology. The atmosphere in the auditorium was more 'heady' than corporate since this was primarily a show held by engineers for other engineers and technicians. New ground was being explored with each of the value-packed sessions and no one



NO SUPPORTS (left) and supports (right). Ring supports inside of the outer circumference are almost mandatory if you expect to maintain rib integrity with untrussed dish designs.

there knew exactly where the events then being set into motion would lead them.

Programmable motor drives, **auto-polarity-switching**, **low-cost** single down conversion; all of this and more were but pipe dreams in 1979. A financial service to help TVRO dealers sell systems? Why, **there were no dealers in 1979!**

Miami, Florida; February of 1980. Bayfront Park Auditorium was the site for the second SPTS/industry show. Slightly more exhibitors and a larger audience including attendees from five continents. There was a subtle change in the atmosphere: the pioneer ambience remained in the seminars while the corporate marketing types (including an early contingent from Heath Company) were walking the aisles. The handwriting was on the wall alright; TVRO was going to amount to something. This was the first show where Jamie Gowen (ADM) and Randall Odom (Odom Antennas) were on hand. Clyde Washburn was also attending his first show offering the first receiver that got you down to 70 MHz in an 'outdoor mounting container.'

In early 1980, satellite television was still the secret of 'the in crowd.' As this person was preparing our 16 footer for the industry's first public display of an Intelsat signal we were approached by a pair of inquisitive cyclists making a tour of the Bayfront Park Auditorium.

"What are those BIG things?"

I answered satellite TV antennas.

"You mean you can get TELEVISION from a satellite???"

The very notion of being able to watch 20 or 30 or 40 (pickings were slimmer in 1980) TV channels from satellites was mind boggling to bystanders in 1980. It kept me up a few nights as well, as I recall.

Later that day as an unseasonably crisp evening set in, long after the day's activities were over in the auditorium, a crowd of at least 100 hung on to watch the experiments with Intelsat. They were rewarded when my 16 footer and a smaller 13 footer found a live soccer game feed from an early Brazilian service. I doubt anyone in that crowd of

by
Jim Vines
611 Farmview Road
University Park, IL 60466

(Photography courtesy of Tim Harrington, Dallas, Texas).

RIP VAN WINKLE/ continues on page 30

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RIP VAN WINKLE/ continued from page 27

100 will ever forget the genuine excitement that captivated the onlookers and participants that evening. It was, truly, a once-in-a-lifetime experience.

The Miami show was also noteworthy for the appearance of the man who would later purchase STT from Bob Cooper and rename it slightly to STTI. Rick Schneringer created the really big dealer oriented shows we have in the industry today and he and Glorinda deserve our recognition for taking the ball and running with it as the industry grew.

June 11, 1984

I was flying to the Niagara Falls STTI trade show; my first in more than four years. The chap sitting next to me on the airplane casually asked if I was going to 'the satellite show.' When I said yes and remarked that I had been an exhibitor at the first such show, 'way back in 1979,' my neighbor (a corporate marketing type) said something like "Did they really have shows back then?". He probably never heard of Oliver Swan.

Approaching the imposing International Convention Center the following morning I instantly found myself aware and somewhat in awe of the change that had swept over the industry in four short years.

Inside the center and out back amongst the antennas, I felt not a little like a modern day Rip Van Winkle; and while much had changed, there was still plenty to be encouraged about.

Several developments that have come on during the last couple of years were much in evidence at the Can-Am show. Not in order of importance, they were:

Advances in receiver ergonomometry and esthetics, along with the consolidation of multiple functions into a single box. No question about it; today's receivers have their functions better located with improved graphics and user identification. The end result is certainly a better-looking as well as a more functional layout; indeed, front-panel esthetics has found its most exciting expression in the more consumer-oriented receivers. I was in particular impressed with the trend in top-of-the-line receivers to consolidate everything from dish control and polarization selection to stereo processing. I don't suppose you would believe me if I told you we used to rotate our polarization with TV antenna rotors, move dishes with our shoulders and be satisfied with 'mono' audio just four years ago.

And then there was the opposite impression. If consumers have an eye for pleasing receiver esthetics and simplified and consolidated operator controls one would expect them to also have an eye for picture quality. For all of the energy many exhibitors put into their displays it was disappointing to see the often poor-video-quality being churned out at so many booths. And in all fairness, the fault may not have been with the receivers.

I was delighted to see the latest AVCOM receivers on display; a far cry from that huge, raw aluminum box first displayed in Oklahoma in 1979. Andy and Pat Hatfield have struck what I believe is a reasonable balance between dollars spent on performance and dollars spent on looks. In my humble opinion it is still very difficult to find a better picture balance between dollars spent on performance and dollars spent on looks. In my humble opinion it is still very difficult to find a better picture looks. In my humble opinion it is still very difficult to find a better picture than one gets from an AVCOM. Maybe that's because Andy, like I, comes from 'the old school' of TVRO where lessons were learned the hard way.

If receivers were a mixed emotion for me, the programmable motor drive was not. We had no motor drives in 1979. I'm not sure we had any that cost less than \$4,000 each in 1980. One could argue without too much fear of contradiction that the proliferation of programmable motor drives has been one of the two or three most important 'engines' driving this industry since I stepped off the train back in 1980. I do remember people who told me back at that time they would **not purchase** a TVRO (for their home) **until** a 'programming motor drive' was available. I'm sure most of these now have just such a system in their homes.

And then there were the antennas. I happen to have a special place in my heart for antennas. I also happen to have certain experience in this part of the industry. I heard many people say 'that is a promising design' as I toured the lot. You can take the word '**promising**' a lot of different ways; not all of which are good. The antennas on display at Niagara Falls were a mixed bag although I could stretch my integrity a tad and suggest that what I saw there was slightly better



SPUN MESH promising.

than I have seen in my non-show travels in the interim four years since I last attended a real show.

A continuing source of consternation to a purist, and I still consider myself to be a purist when it comes to antenna design, is the very poor rim integrity shown by some dishes. You may not know what rim integrity is. That's OK; we all had to learn the hard way. Rim integrity is simply what you 'see' with your naked, unaided eyes as you stand back about 10 to 15 feet and site across the front or leading edge of the dish. You should be able to position yourself so that the back or far



A GENTLE PUSH/ and watch the 'waves' ripple through the entire dish. Not good.

edge of the dish rim aligns with the near or front edge of the dish; **they are absolutely in line with one another.** When they are not, well, that means the dish does not have a pure parabolic shape to it. And that's not good.

Then there were those with obvious design flaws; even if they somehow managed to have the appearance of good rim integrity on the show model, it didn't take a special eye to spot obvious flaws in the overall design. For example, among the segmented mesh antennas with ribs the most oft-observed design omission was adequate provision for **automatic registration of all of the ribs in the same plane.** It simply does not do to have the ribs floating around the hub structure with no firm place to anchor to and call home. You don't maintain parabolic integrity that way. Among those antennas with trussed-rib



RIM SITING/ you can 'see' the far edge of this dish on the lower 60% or so of view but the upper part is out of sight. The dish is warped and will not provide an accurate nor precision 'focal point' where it should.

designs, the problem has been pretty well sorted out. Sadly, those with un-trussed ribs have a ways to go yet.

The trussed-rib designs generally use fewer ribs than those with the un-trussed ribs. Here the problem is to maintain both the precision **shaping** and the precision **placement** of the concentric ring sections that span between the trussed ribs. This is absolutely essential if the reflective mesh is to span and conform reasonably well to the 'parabola of evolution' format. (In this observer's opinion, the occasional surface ripple is almost inconsequential but the large area or zonal errors can be very damaging. And it is the 'zonal errors' which are almost impossible to see, except by careful observation of the rim integrity.)

The alternative approach to trussed ribs is to have '**lots of** untrussed ribs.' Unfortunately, untrussed ribs are not suited to mating with a precision center hub (Continental's approach) or with a precision-

punched sandwich plate design (Paracclipse's approach). So what the untrussed rib designs may gain by having **more ribs** they lose by not having adequate means for automatic (and foolproof) registration of **all ribs in the same plane.**

My observation is that mesh antennas have 'great potential' and so, they are 'promising.' To realize this potential in the real-world with larger models, one manufacturer (Continental) told me they always send an experienced, trained technician to supervise the installation and to provide instructions; as they have done in the past in the Middle East.

Another 'promising' mesh concept at Niagara Falls was a line of spun dishes from American Metal Spinning of Laval, Quebec. One must wonder why no one previously thought about spinning mesh (actually, American uses perforated metal, not the expanded format). Spun dishes are not problem free, however, if they are to be segmented for shipment. And any firm in this business will be faced with balancing the pressures to ship product against the final inspection of the 'QC' people. I don't envy those charged with that task.

The problem (or challenge) for any new concept is that it must be rendered competently in the real world to gain broad public (ie. dealer) acceptance. Product design, the manufacturing process, concise printed instructions, installer training and even the marketing of the product are all inter-related. This is just as true for TVRO antennas as a new concept in lawn mowers.

While I was inspecting antennas on the Niagara Falls lot with CSD/2 photographer **Tim Harrington**, my attention was drawn to a lavishly advertised line of antennas. Photographer Harrington had already dubbed one of these antennas his choice for 'Worst Of Show'. To prove his point, he merely touched the antenna at the rim, or at the end of a rib. This resulted in an instant 1-inch deflection of the surface. Pity. The air-brushed rendering of this nine footer **looked 'so promising' in the advertisements!**

The nine footer's 'Big Brother' had another problem. 'Watch this' instructed Harrington as he deflected a trussed plastic rib. A wave motion spread out almost 90 degrees in either direction as rib after rib oscillated up and down. The culprit here was a poorly thought-out backing structure which refused to hold the ribs solidly in place.

Mounts. Shudder. Too many of the single post mounts at Niagara Falls were badly underdesigned. One should not expect consumer mounts to be as big and beefy as commercial mounts, and I am not an overt purist in this area. However, some of the mounts in Niagara Falls were **just plain scary.** Photographer Harrington took some delight in 'tweaking' or 'bumping' mounts as we walked through the antenna lot and I often stood back in amazement as the dishes gyrated and oscillated wildly on their mount stands. Repeated dish movement with a minimum of effort by Tim revealed the kinds of stress-concentration (where dish **meets mount**) that should cause antenna manufacturers sleep-less nights and an early morning check on the status of their product liability insurance. As noted by New Mexico dealer Henri Guerin (CSD/2, June 15, 1984) many TVRO owners can now afford 'good attorneys'! After a few TVRO damage claims have been settled in the user's favor, I predict that lawyers will start looking upon the TVRO industry as a fertile, new area for litigation. That might not be all bad; what would probably force mount and antenna manufacturers to beef up their products would be a series of lawsuits settled against them, or, a sudden rise in product liability premiums to reflect the high rate of product failure.

And these final observations. Way-way back in 1979, we had no distributors, let alone dealers. Until October of 1979 there was no private TVRO trade journal (Coop was of course first) nor any program guides (they followed in the spring of 1980). So, there was virtually no-way to get anyone's attention even if you had a warehouse filled with TVRO terminals ready for sale at \$1,000 each! Today we have trade journals for the professionals, 'insider' journals for the amateurs, and even a newsstand distributed publication for the consumer. And we have many, many program guides.

Today's product availability and product pricing did not 'just happen' because somebody had a clever design or manufacturing breakthrough. It happened because an entire infrastructure of support industries (such as programmable motor drives) and support disci-

OUT OF THIS WORLD!!

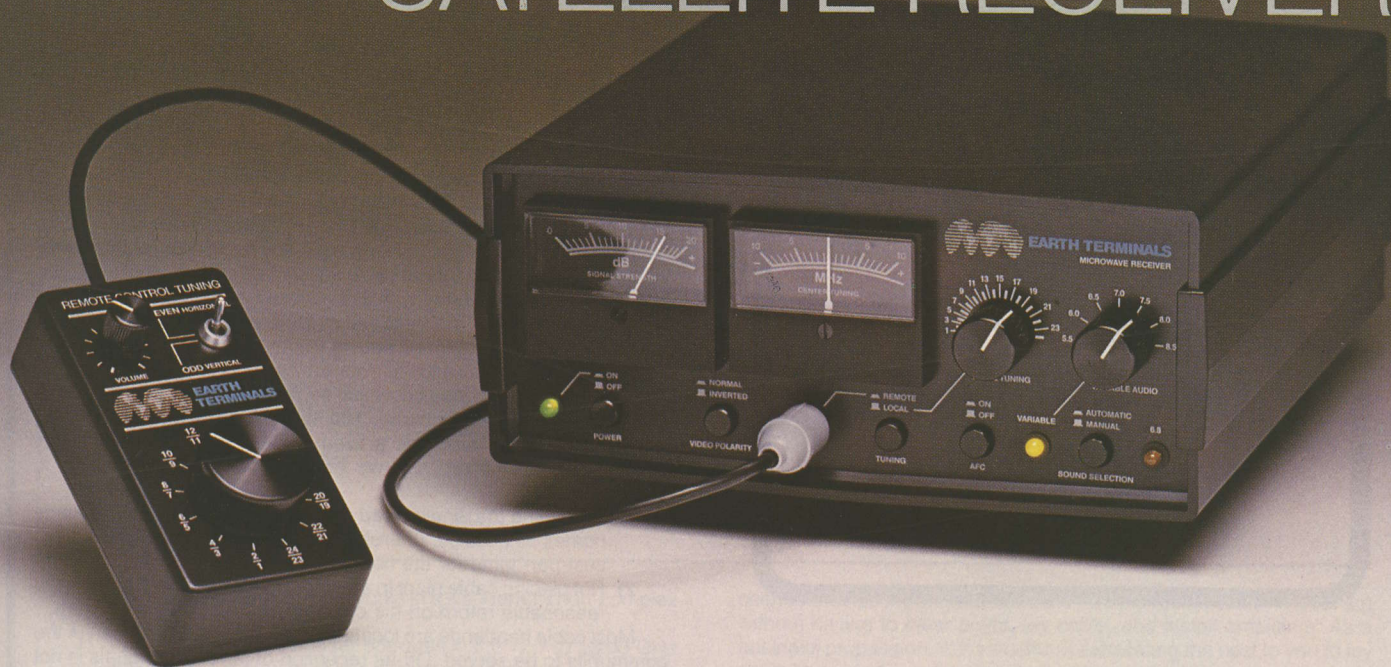


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plines (such as component styling) matured along the same track at the same time. This observer didn't merely find an impressive array of

new products at lower prices in Niagara Falls; he found an entire new industry!

CHANNEL MASTER MICROBEAM SYSTEM

ABOUT Channel Master

Channel Master has been supplying television antennas since the television boom of the late 40's and early 50's. In 1950, the year that 'television took off' and an 'amazing' seven million (black and white) receivers were sold, Channel Master patented the first pre-assembled television antenna; the first step towards providing installing dealers with a home antenna product which would 'snap together' and assemble in minutes, rather than hours.

Today's Channel Master is a segment of a major electronics family: **Avnet, Inc.** (see Coop's Comments, this issue). Today's Channel Master is a multi-national firm with manufacturing facilities in the Far East and a customer base that covers the globe. In 1982 corporate parent Avnet authorized Channel Master to open **Avnet Development Labs**. The philosophy behind Avnet Development Labs is interesting. CM President **Syl Herlihy** foresaw the need for the firm to move into the 'high technology' microwave video era. He needed to 'leap' into microwave quickly.

Herlihy recruited a group of senior scientists and development engineers, largely from the high-tech 'Greater Research Triangle' region of North Carolina. Then he went to work rounding up nearly a dozen CATV franchises in **small towns** surrounding their headquarters. He had a concept; the small towns, **too small to be cabled in the traditional cable fashion**, had been passed-by as large cable firms fought to grab territory in the 70's. Herlihy was betting that his new R and D staff could create new microwave technology to make it possible for these small towns to exist as cable properties.

Herlihy, and others in the CM staff, were familiar with the Hughes Microwave 'AML' microwave system; a system that allowed the cable operator to go from cable-trunk to microwave, and back again, to 'leap over' segments of ground where cable was too expensive or simply not profitable for housing groups smaller than a thousand or so at a 'whack.' Herlihy was also aware that the Hughes AML was 'old technology,' first developed (and designed, **and priced**) more than a decade prior. Herlihy also knew, instinctively, that microwave technology had changed radically in those ten-plus years. This suggested to him that even if the same-exact technology was re-applied in 1982, the costs would be far lower.

The Avnet Development Labs team, however, had no intention of merely duplicating the Hughes package. They had more pride, and too much youthful drive to allow them to follow down any 'tired' California microwave footpaths. That was the other element; California had a reputation as **'the microwave center'** for North America. There was a matter of 'state-pride' driving them as well. Why should California be the only place that innovated in microwave?

MICRObeam

The concept of MicrobeamSM is deceptively simple. Most readers

understand the basics of cable distribution (see SMATV System Engineering series currently appearing in **CSD**). One or 12 or 50 or some other multiple-number of individual TV channels are carried on a cable-secure transmission system from the origination point (called 'cable headend') to individual cable subscriber homes. There are two attendant costs associated with any cable system; the headend, and the cable plant itself. The headend costs are fixed, a function of the number of channels carried and the complexity of the equipment required to 'clean up' and 'perfect for cable carriage' each of the selected channels. Those costs will be **the same** whether the cable headend is to serve **one** home, **100** homes or **100,000** homes.

The cable plant also has a fixed cost; of so many dollars **per cable-plant-mile**. There are two things the cable entrepreneur is concerned about:

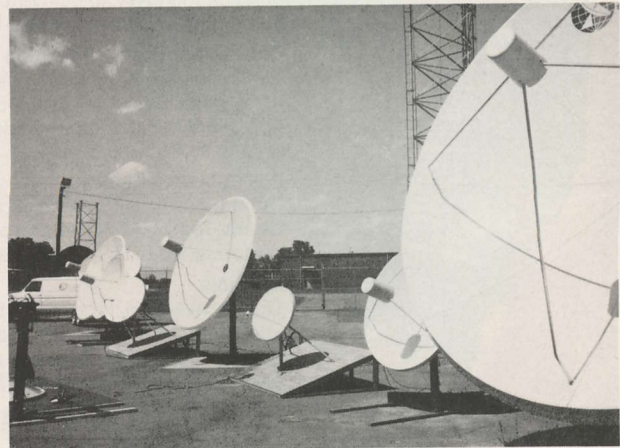
- 1) Spreading the single **fixed** cost of the headend over as many homes as possible (thereby bringing down the actual shared-cost-per-home for the headend), and,
- 2) Not placing cable plant in any region where he cannot expect a reasonable return on his **cost-per-mile** for the cable plant.

Most cable headends are located away from the central part of the community to be served. Off-air reception of terrestrial signals is not good in a built-up industrial or suburban environment. And cable reception of satellite signals is also often hampered by a 'congested skyline.' This forces a compromise; the cable headend is situated close to the center of the community to be served, **but far enough 'out'** to be able to develop noise-free (no-interference) off-air terrestrial signals and 'clean' (TI free) satellite signals. This usually results in the headend being further 'out' than 'in.'

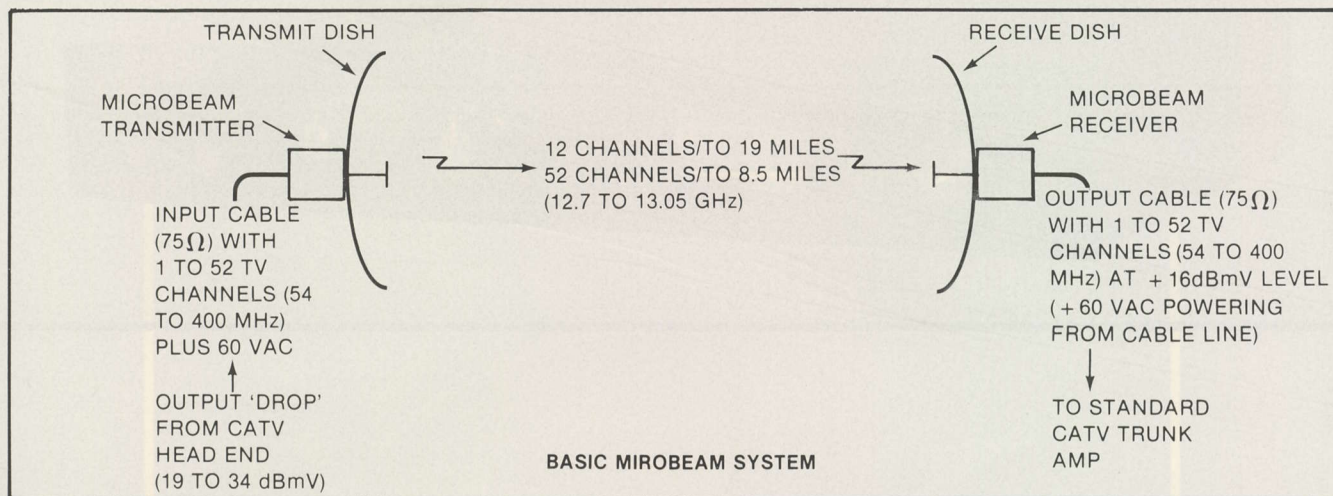
Often the central or core community stands alone, while surrounding it within 'easy commute distance' there are other **satellite-communities**, housing developments and others centers of population which also need to be served. Microbeam, or a package like it, is ideally suited to all of these situations.

In each instance where there is a cable headend and the operator desires to serve as many homes as possible with that single headend (thereby reducing the per-home-cost of the headend) there is the opportunity to 'extend' the cable system into nearby territory to pick-up additional homes beyond the core community. **The traditional way** to get from the nearest edge of the core community to the nearest edge of the 'satellite community' is to lay a cable 'trunk' between the two. Cable plant (trunk) is one of those 'known' cost factors; the operator can accurately calculate the exact cost of every mile (or fraction thereof) before ever laying the first foot of cable.

Microbeam replaces needless cable trunk, bridging or crossing



CHANNEL MASTER ANTENNA test range is loaded with dishes for both 4 and 12 GHz. Tower in background holds one-end of test range (receive antenna) for plotting antenna performance.



the same distance as the cable. It works in a wonderfully non-complex way (see diagram).

- 1) The Microbeam transmitter operates in the 12.7 to 13.05 GHz region. This is similar to the K band satellite frequency range (12.2 to 12.7 GHz) so you know the wavelengths are very short, must have 'line of sight' (no obstructions in between) and microwave engineering applies.
- 2) The Microbeam transmitter consists of a sophisticated upconverter which is driven or fed by the actual cable (trunk) mixture of TV channels. In effect, you simply connect a line from the cable system to the input of the Microbeam transmitter and it **upconverts all of the channels** from their normal VHF frequency assignments to a new microwave frequency.
- 3) The Microbeam transmitter sends the entire upconverted block of cable TV channels through the air, using a dish antenna, to one or more specific locations. Because of the frequency (12/13 GHz) the size of dish required for high-gain and very narrow beamwidths is manageable (4 to 10 feet). The dish also contributes considerable 'circuit gain' to the system.
- 4) At the receiving site(s) a similar dish antenna, pointed at the transmit site, picks up the signals in the 12.7-13.05 GHz band and then a downconverter shifts the microwave band back to the precise cable TV channel frequencies they started on, back at the transmitter end.

The end result is that you have transmitted all of the TV (and FM)

channels inside the original cable over a distance (up to 20 miles or so) without having to clear poles, lay cable, and install amplifiers. As a business proposition, it is a matter of calculating the cost to you to lay cable to cover the same distance, versus, replacing that segment of cable with Microbeam.

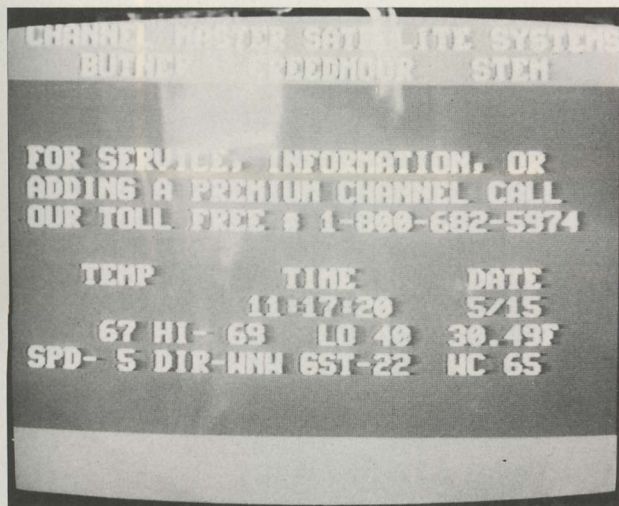
THERE Is More

Cost is not the only consideration. Perhaps the distance to be covered cannot be cabled; terrain (a lake) or lack of telephone/utility poles between the two points makes it impossible (or at best mightfully expensive) to get from 'point A' to 'point B'. In this situation, Microbeam is more than a cost-versus-cost consideration; it may be the **only way** to get the cable service signals to the new area.

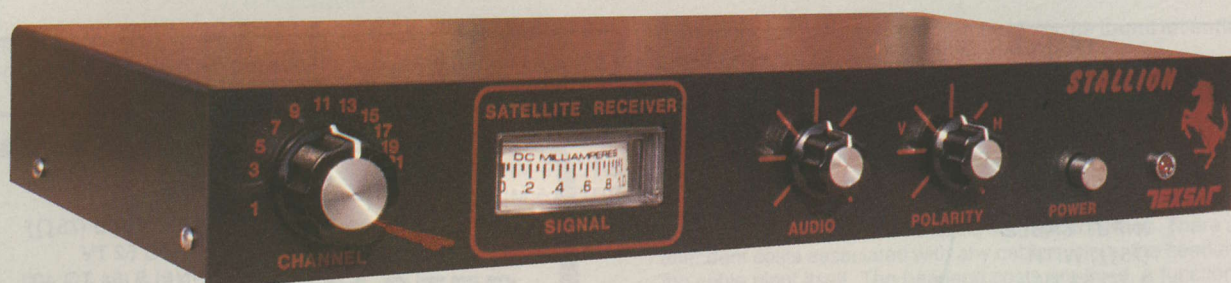
There are other considerations as well. In our 'SMATV Plant Design' series now running in CSD, we have also learned that each time we send a cable block of channels through cable, we must re-amplify those cable channels at some precise distance with a new cable line amplifier. The cable line amplifiers are not totally opaque to the signals; each amplifier does add some measureable amount of signal degradation (noise, interference) to the cable channels. Eventually, no matter how well you plan the system, you find that you can no longer amplify and further cable-transmit the signals because you have increased the 'noise floor level' and the 'interference floor level' of the cable signals to the point where the noise and interference is now very objectionable to the cable viewer. This is called 'cascadability,' or the limits placed on ultimate cable plant length by the increase in non-wanted noise and interference.

The Microbeam system also contributes some noise and interference level to the signal(s) that passes through the system. However, that noise plus interference contribution is only a tiny fraction of the noise + interference that would be added to the cable signals if they were carried the same distance in regular cable (plus cable line amplifiers). Therefore, **the use of Microbeam can extend the actual total distance covered by the cable plant**, before the plant must stop because of cumulative noise and interference.

Finally, there is the obvious dollar trade off between serving a satellite community with the signals from the primary headend (built to serve the primary community), or, serving that same community with its own 'stand-alone' headend. This is a relatively simple dollar for dollar comparison, at least for the equipment; i.e. the cable headend required will cost \$80,000, and the Microbeam system can be shared so that it costs say \$40,000 in real dollars. There are other savings here as well; by having only one headend to maintain, you reduce the number of hours per week (and dollars per year) which must be spent maintaining headend equipment. Most of the day to day or week to week equipment 'adjustments' which must be done in a typical cable/SMATV system are concentrated at the headend portion of the system. If you can serve **many** communities from a **single** headend, you can save many dollars by focusing all of those adjustment and maintenance



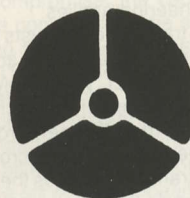
CHANNEL MASTER Satellite Systems share common headend source which Microbeam links to individual community sites.



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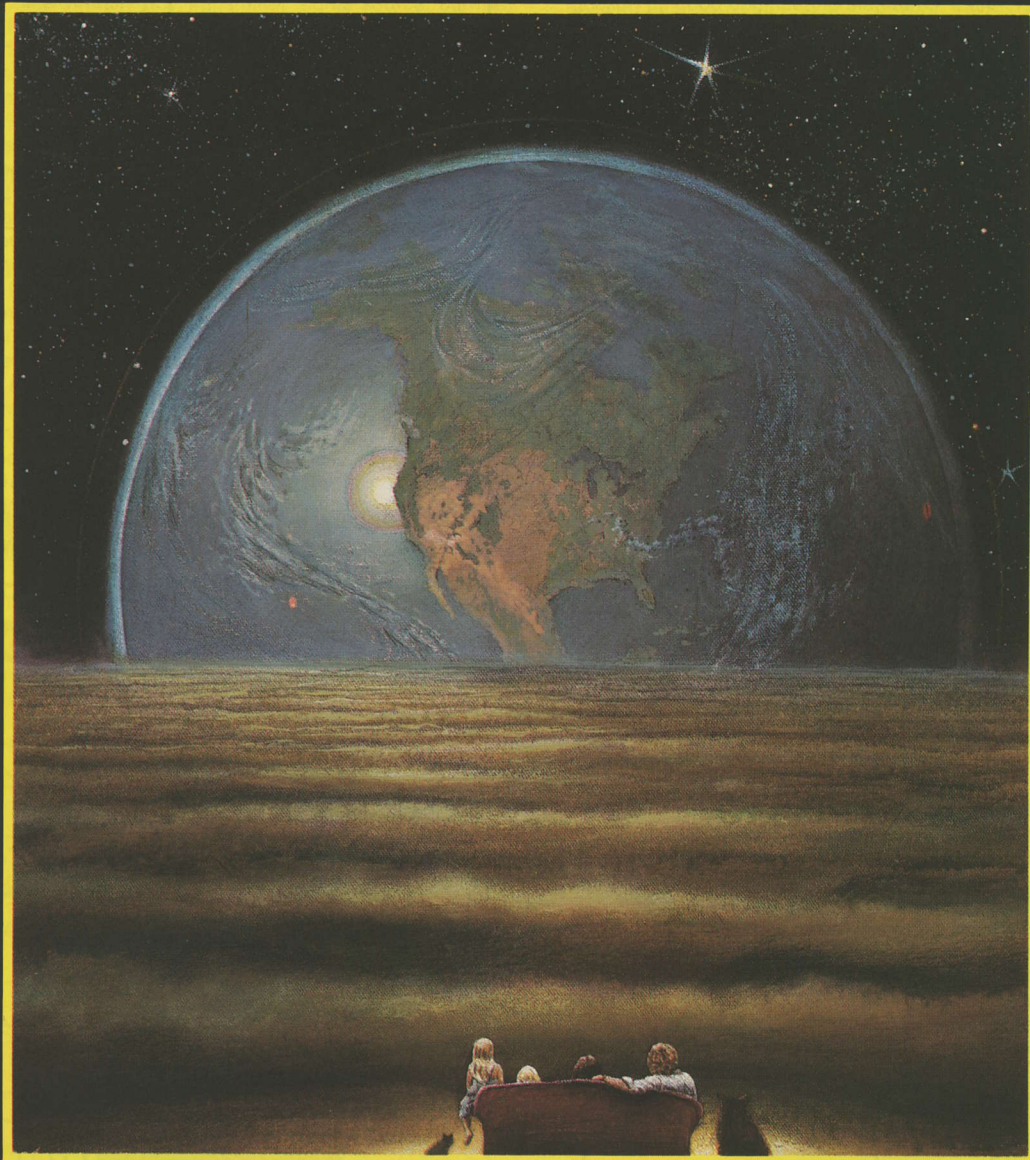


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MICRObeam/ continued from page 35

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TECHNICAL Parameters

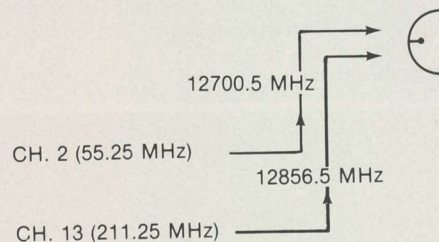
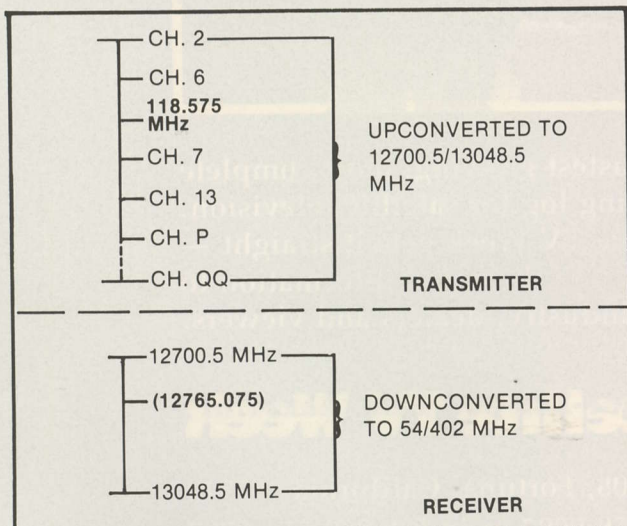
Channel Master approached the Microbeam system design by going into the 'real world' of CATV/SMATV. In the 'Triangle' region of central North Carolina, they located a number of communities which were without cable service. Using conventional cabling techniques (one headend per community, since few were so located that headends could be shared), one or perhaps two could be marginally successful at long-term payoffs as cable investments. Some of the really small communities (100 homes is small!) would, by their location and distance from other larger communities, **never** be in a position to have cable service. The headend cost for a 12 or 20 or 50 channel cable service was simply not balanced by the expected revenues from the community. **Microbeam was the only answer** and since Channel Master wanted to 'prove' that small communities could be viable in 'cluster groups' using a shared headend and Microbeam, the pressure was on Avnet Development Labs to create a microwave system which would allow the communities to be served. Channel Master is therefore 'in the CATV business,' although their system clusters in North Carolina do serve a dual-purpose; both as an investment for the corporation (cable properties DO generate good income) and as a real-world test of their Microbeam packaging.

The cable service can feed into the Microbeam **transmitter** at any point within the cable plant. The 'link' can be installed at the primary community headend, or anyplace along the plant itself. Cable (trunk) line signals in the +19 to +34 dBmV signal level region (typical levels for a trunk) are simply wired into the 'input' on the transmitter. The transmitter cleverly installs right at the dish antenna and the dish (transmit) antenna in turn is installed at a sufficient height to provide line-of-sight transmission to the one or more receiving locations. The upconverter/transmitter is housed in a weatherproof container attached directly to the rear of the dish. Power for the upconverter/transmitter is also cleverly taken from the CATV coaxial cable (trunk) feeding signals into the upconverter. The transmit package functions from the same common 60 volts AC which cable trunk amplifiers also use for powering. This eliminates any special powering connection requirement.

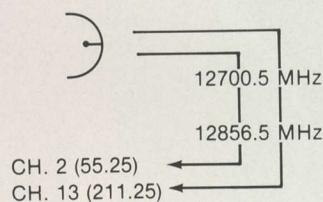
At the receive site, the system reverses. A dish antenna, with the microwave region Microbeam **receiver** directly mounted at the rear of the dish, is powered by the 60 volt AC cable line powering for the cable-plant-segment which the receiver serves. The signal level leaving the receiver is in the +16 dBmV region; just enough to allow you to install a standard trunk amplifier at the receiver location and carry on as if you had been 'inside of cable' all of the distance.

MULTIPLE Receive Sites

If you have one master headend, chances are you may have more



BASIC TRANSMITTER UP CONVERTS ALL (STANDARD) CABLE-CARRIED TV CHANNELS BY 12645.25 MHz



BASIC RECEIVER DOWN CONVERTS ALL MICROBEAM FREQUENCIES BACK TO STANDARD TV CHANNELS



ENTIRE HEADEND ON THE TOWER/ Microbeam (receiver) couples through WR-75 waveguide to feed in front of dish and is powered by cable system's 60 VAC powering source through trunk cable fed up to Microbeam unit from cable plant on or in ground below.

than one 'satellite community' which can or should be served from the same headend. You could, of course, stack multiple transmitter systems at the same site and dedicate one transmitter to each of the outlying communities. That involves doubling (or tripling) up on the transmitter-end costs; there is a less expensive way to spread the dollar over more homes-served.

Microbeam, like virtually any transmitter signal source, can be 'power split' so that a portion of the power ends up going in two or three or even four different directions. This means that expansion from one sub-distribution center to two or three or four involves splitting the transmitter signal at the transmit tower, adding an additional transmit dish (or dishes) and then installing separate receive systems (down-converters plus antenna) at each of the sub-distribution points. Remember — **the name of the game is to spread the headend costs over the largest possible number of homes served.**

Restrictions apply when you begin to (1) add channels, or, (2) split transmitting power into multiple directions. It works like this:

- 1) The transmitter power is 'linear' and 'shared' between all of the carriers (channels or signals) passing through the package. **All of the available power** (up to 'saturation' or maximum output possible) is used by that **single** channel. If you have **12** channels, they **share** the total output power in equal **1/12th increments**. And so on up to 52 channels (maximum possible).
- 2) Each time the power is split, adding new transmit antenna directions, a proportional share of the full output available is siphoned off for the new directions.

These two factors work in something called 'the link computation,' a study, done on paper first, to determine just how far you can transmit using Microbeam and still arrive at the desired (line of sight) receive location with sufficient signal to provide high quality cable transmission service in the (satellite) community.

The transmitter's actual output power, per channel, is very low; even by microwave standards. This is possible because of the 'dish gain' at both the transmitting site and the receiving site(s). For example, with only a single channel going through the transmitter, the total output power is but 20 milliwatts or 20/1000th of a watt. **And that's high power!** For the opposite extreme, 52 channels, the power-per-channel is the equivalent of 0.6 milliwatt or 6/10,000 of a watt. Micro-

wave transmission is pretty amazing, 'low-pollution' stuff (the numbers are not so amazing when you consider that 5 watts on the bird gets us 24,000 miles or more and we are going less than 20 miles in a typical Microbeam installation).

Actually, the number of channels plus the power output level, which will equal a certain maximum distance to be covered, is more a function of 'good engineering standards' than it is 'flat-out coverage limitations.' The Microbeam is intended to be as 'opaque' to the cable viewer as possible; that means no objectionable interference or noise is added as the cable channels pass through the Microbeam transmitter plus receiver. To insure that this is the case, cable engineering standards require that the ratio between the desired signal and any non-desired interference ('beats') or noise be kept at certain minimums. The magic number here is someplace between 55 dB and 65 dB for interference. If you are willing to accept slightly higher signal to beat ratios (such as 55 dB versus the higher standard 65 dB) you can stretch the system's microwave path length by adjusting the system's operating power. Some relevant numbers follow:

Total TV Channels	Max Miles/55 dB	Max Miles/65 dB
12	20 miles	17 miles
24	17 miles	13 miles
36	15.5 miles	10 miles
52	14.5 miles	8.5 miles

And that's for a single transmit-receive path. Now if you take the same single transmit site and go for two or four receive sites (and two or four separate transmit antennas), we have the following numbers at **60 dB** carrier to interference (composite triple beat):

Total TV Channels	Max. Miles/ 2 directions	Max. Miles/ 4 directions
12	16.6 miles	14 miles
24	12 miles	8 miles
36	9.5 miles	6.5 miles
52	8 miles	5.5 miles

As you can see, there are engineering decisions, and dollar trade-offs involved when you begin to **up the channel count** plus **further divide** the available output power for two or more receive sites.

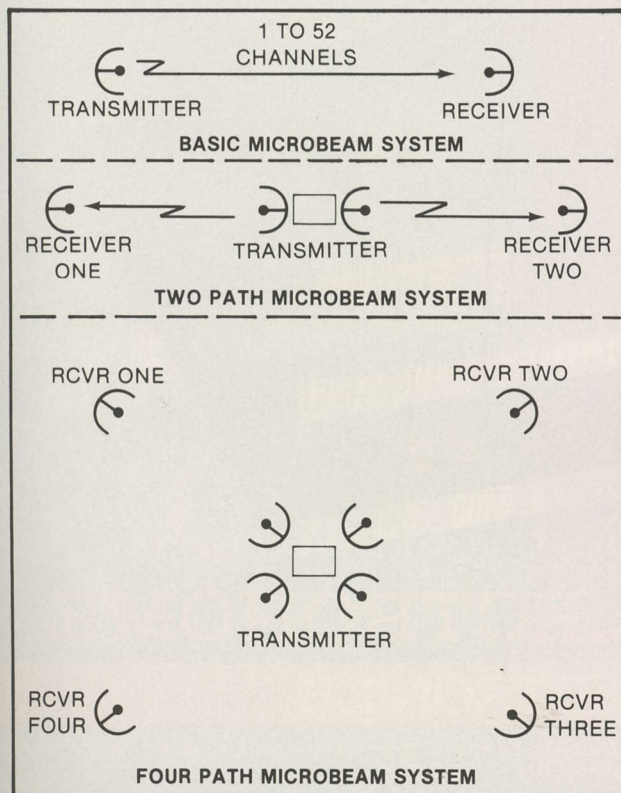
CONTROLLING The Frequency

The upconverter moves the basic cable channel frequencies upwards by 12,645.25 MHz. That's quite an upconvert! Then the down-converter reverses the process by shifting the Microbeam block downward by 12,645.25 MHz. Like any up or down conversion, there is an oscillator involved which provides the 'mixing action' to shift the frequency up (or down). The (local) oscillator must be exceedingly stable under some pretty adverse conditions since both the transmitter and the receiver(s) are located at the dish proper, up on a tower, where the temperature change is considerable. When you are dealing with a microwave frequency range 'oscillator,' temperature (and even humidity) variations will cause the oscillator to change frequency. In a system like this, not being mindful of this probability would cause the system to 'move' channel 2 (etc.) up or down in frequency on the cable system; possibly moving them so far that the in-home TV receivers would no longer 'lock on.' AFC, or automatic frequency control, is the answer.

The Microbeam designers decided to inject into the transmitter-source channel-mix a pair of special 'pilot carriers,' in the 119 MHz region. The receiver knows that these pilot carriers should be there, and it knows what their precise frequency should be (with 0.005% frequency tolerance). When it monitors and measures the presence of these carriers, and finds them anyplace except where they are supposed to be, it automatically adjusts the microwave region oscillator at the receiver to bring the whole system back to the proper operating frequency.

BEHIND The Design

Herlihy's team responsible for the Microbeam is very impressive. **Marc Rafal, Larry Burton** and **William Joines** have put together both the Microbeam package (which has FCC approval for use in cable and SMATV applications) and they are currently working on several new



DOWN TO EARTH SIMPLICITY

The Electrohome E-1 integrated receiver/positioner is so simple to operate it makes every TV viewer a satellite prospect.

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The microprocessor memory eliminates the need to re-program—even after a power failure. It also remembers which programs parents don't want their children to watch. Moreover, the programming can't be upset by curious button pushers.

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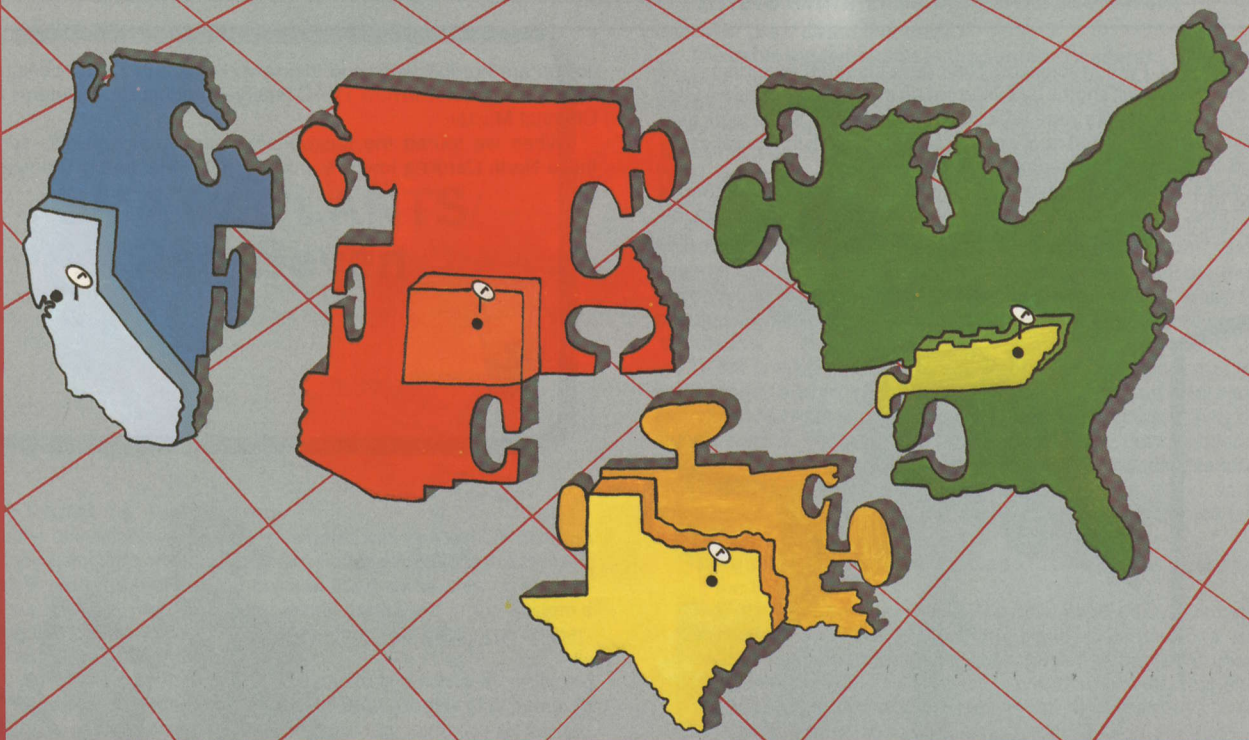
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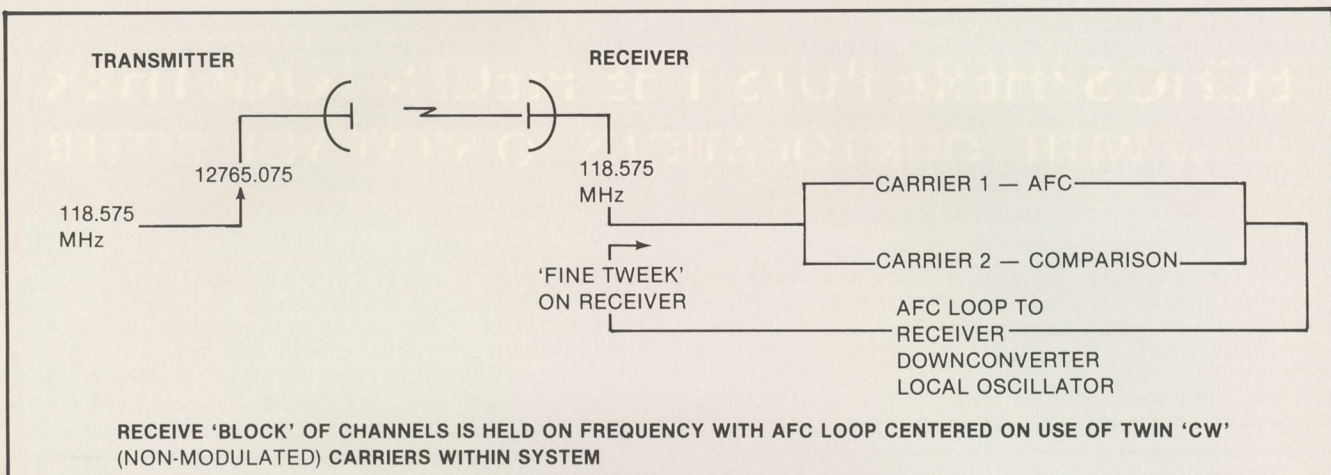
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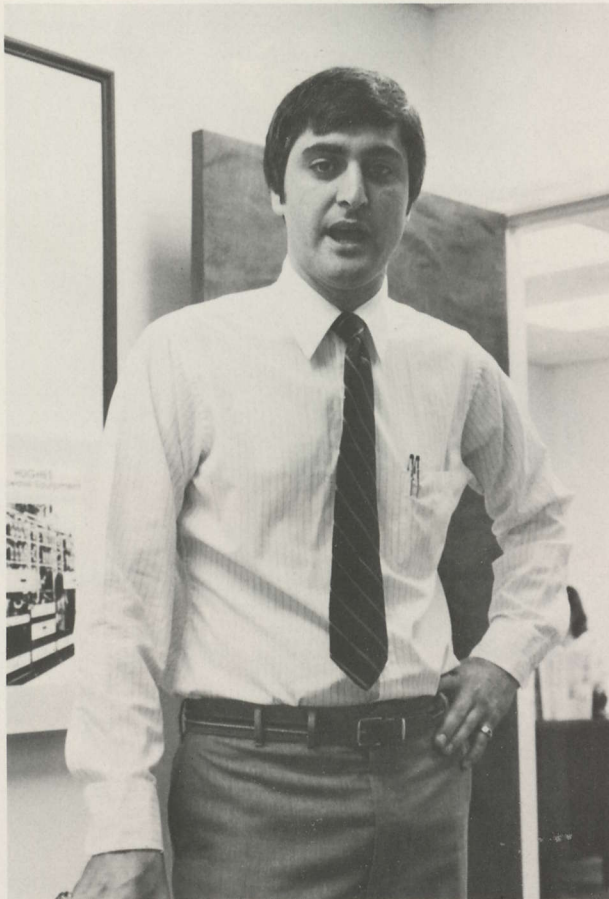


generations of TVRO receivers. Their demonstrated expertise in 12 GHz microwave will shortly be evident in an entire family of new 4 GHz receiving systems. We were especially intrigued with some work they are doing in the BDC and dual-polarization area; work that breaks new ground for both design segments of our business.

Avnet's decision to invest heavily in an R and D program is admirable; it takes Channel Master out of the pack running in the same directions with the same basic designs. Rafal, Burton and

Joines are not followers and their involvement in TVRO design will shortly be reflected in new TVRO receiver products and systems from Channel Master.

When we toured the Microbeam operational network, serving those North Carolina towns surrounding the 'Research Triangle' re-



DR. MARC RAFAL heading up the Microbeam team and the research work at Avnet Development Labs. He, Burton and Joines bring a new and uncluttered perspective to microwave signal processing design problems.



KARR AND DOZIER came out of the TVRO industry, starting out as installing dealers for TVRO systems in the mid-west. Now they 'host' the CM Microbeam system in North Carolina as well as directing field installations of the Microbeam packages worldwide. Stem, North Carolina headend tower (with 12 GHz Microbeam dish and electronics) behind them; the first system 'trunk amplifier' station in foreground.

gion, there was another surprise. The two lead field people, responsible for maintaining and field-proving Microbeam, are out of our TVRO industry. **Randy Karr** and **Steve Dozier** began their technical life in microwave by teaming up to sell TVRO systems. When Channel Master found a need for microwave-able field techs capable of learning the Microbeam project from the ground up, they quickly signed up for a tour of duty. The full system is now 'their baby' and onto their shoulders falls the responsibility for keeping several thousand cable subscribers served with dozens and dozens of satellite plus terrestrial TV channels.

What Channel Master has done here is to very carefully take the original Hughes 'AML' experience and update it with modern technology. Hughes used old-style 'klystron' power amplifiers to generate their transmitter power at 12 GHz. With the Hughes gear, you have to run expensive and finicky 'WR-75 waveguide' (transmission line) from the indoor, environment controlled 12 GHz transmitters up to the transmit dish. Such runs of waveguide, expensive and difficult to keep

secure from moisture and vermin, are totally eliminated by the Microbeam approach. Where Hughes used brute force (at high maintenance dollar costs) to cover ten miles, Channel Master uses state of the art technology. The dollar savings are substantial and we could detect no measurable or visible degradation with their approach.

Lest you be lulled into a sense of 'cheapness,' however, be advised that no (present day available) microwave relay system is 'cheap.' Hughes' packages, capable of transmitting 50 or so channels ten miles run in the \$350,000 region and that's hardly inexpensive. The same performance from Channel Master will be about 1/4th that cost, and to many that is 'still not cheap.' Still, when you are measuring service-delivered to-cost, one would expect to find a bright market future for Channel Master with the Microbeam system. Hughes has sold hundreds of its expensive systems through the years; Channel Master should do as well, and better, by the time its product package for multiple channel TV delivery is as old (ten years) as the original Hughes package.

SMATV PLANTS/ Part Seven

PURE TRUNK 'vs' Tapped Trunk

Cable television systems are designed with one goal in mind; to earn money for their owners. There are limited exceptions to this 'rule'; ie. cable systems that have municipal (city) ownership or shared-expense systems where all users jointly participate in the system's funding and operating costs. To make money with cable, you deliberately set out to do two things:

- 1) Attract as many people as possible to 'the cable' by providing on-cable **service which is better than** (quality of pictures) or more-than (more bountiful than) ordinary, over-the-air terrestrial television reception; and,

- 2) Spend **as little money** as possible achieving the first goal!

Cutting corners in cable system construction is an art; knowing where you can trim back in system design specifications without adversely affecting the system performance is no game for novices. Often what seems like a good way to save \$1,000 per mile of cable plant turns out to be a very bad operational mistake months or years after.

SMATV or private cable plants are no different; **or are they?** We have written that an SMATV system is really a cable system operating on different legal turf; private property versus public property. We have also written that a private cable system must seek to provide sufficient cable-only services to be an attractive 'alternate choice' for residents to whom the service is offered. In view of recent court decisions which seem to open up SMATV 'turf' to conventional cable (ie. no exclusive areas for SMATV), and in view of legislation drafted to strengthen cable's role when faced with SMATV competition, it suddenly looks as if the cable operator may have an upper hand in competing with SMATV one on one in condo, high rise and other developments where SMATV once had an upper hand.

This month's discussion of SMATV plant (system) design focuses on one area where SMATV may still have a technical edge, albeit a rather shakey edge at that. Our focus this month is on that portion of

the cable plant called 'the trunk.'

The cable system starts at the system 'headend.' The headend is where, as previous portions of this series have detailed, all of the cable-carried signals 'originate' for cable carriage. The actual on-cable services may consist of off-air VHF and UHF signals (so-called 'terrestrial signals') plus off-satellite 'distant signals' (such as WPIX, WOR, et al), off-satellite specialty channels (such as CNN, ESPN, USA, et al) and off-satellite premium services (such as The Movie Channel, SelecTV, et al). All of these signal sources are individually treated and processed at the CATV headend and then 'bundled together' electronically in a single cable which will distribute them to the community or region where the cable system will operate. Once bundled, the first cable leading away from the headend facility is called 'the trunk.'

Trunk is telephone terminology, perhaps stretched a tad. In the cable world, a trunk cable is a very special breed of cable where everything possible is done to maintain the very highest quality of the signals carried. There are several rules regarding trunks; 'rules' created by CATV system design engineers as 'minimum standards.' Every effort is made not to break these rules for to do so is to compromise the quality of the cable service channels carried by 'the trunk.'

- 1) No subscriber is **ever connected** to the cable by plugging into the trunk.

Of all of the rules relating to CATV plant design, this one is sacred.

- 2) The system signal to noise and signal to interference 'ratios' (the measurement of the good guys . . . the cable channel signals . . . to the bad guys . . . any type of electrical energy which might degrade the 'quality' of the good guys . . .) are maintained as high as technically possible on the trunk.

The first rule is easy to understand; you don't install a subscriber tap-off device (such as a 'directional tap') into a trunk line cable. We'll explore how you do connect up a subscriber shortly.

The second rule requires more ground rules.

All cable has loss, as we have studied in prior parts in this series. When the cumulative loss of a piece of cable equals some pre-calculated amount we must re-amplify the cable signal(s) with an amplifier. Every amplifier, no matter how good it is nor how much it costs, adds noise and interference to the cable signals carried.

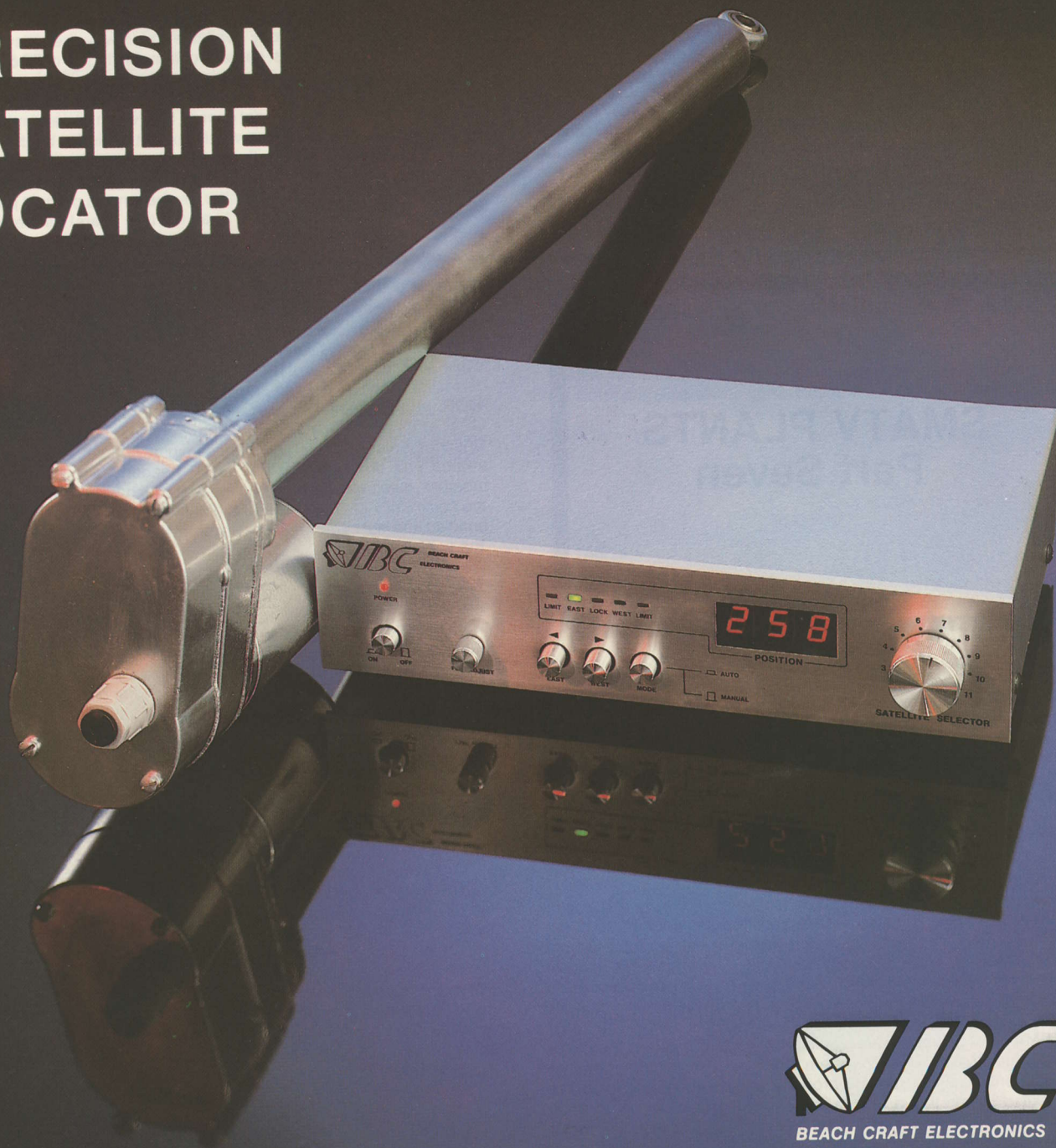
This creates two sub-rules:

- 3) To maintain the highest possible signal to noise and signal to interference 'ratios' we want to use the cable which has the lowest possible 'loss,' because . . .
- 4) To reduce noise and interference we want the signals to be re-amplified **as few times as possible** between the headend and the cable home.

This simply means that if we use large cable (larger diameter cable has lower loss) we can go further, inside of the cable between amplifier stations. Therefore the trunk line usually will use a cable with a larger diameter than we will use in say the 'feeder lines.' Feeder lines? What are they?

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SMATV DESIGN/ continued from page 43

In an earlier segment of this series we explained that all CATV plants have two different levels of actual cable; the trunk line is considered the primary artery in the system, like a freeway built on elevated platforms across a city. No stop lights, no cross streets; you get on the freeway and travel at a high rate of speed until you arrive at the 'exit' you wish to reach your destination. **The exits are the feeder cable.**

Feeder lines literally 'feed signal/channels' away from the trunk line main artery into individual residential and commercial districts. **The subscribers are connected to the feeder lines**, using the directional tap-off devices which insert into the feeder lines of the system.

Feeder lines typically do not travel very far, in distance or cable footage, away from the main trunk line. This is a system design consideration based upon the fact that the economics of cable requires that you degrade the 'quality' of your feeder line amplifiers significantly from the trunk line amplifiers. **You might** be able to operate **as many as** 128 or even more trunk line amplifiers in a line (ie. cascade; one amplifier, cable, a second amplifier, more cable, all the way to some magic point where the noise and interference generated within each amplifier finally 'swallows' the pictures on the cable). But for feeder line amplifiers (called 'line extenders') you will more often operate three or perhaps 6 in a line; at which point the lower system specifications of the feeder line amplifiers will also cause the pictures to be buried in noise and interference.

So a **feeder** line is a **distribution** line; it distributes or carries the actual cable service to the individual subscriber yards. The line passes by each yard and from that point it is carried into the home, subscriber by subscriber, in even less fancy cable such as RG-59/U; the common stuff we use in the TVRO world.

This is not about feeder lines; not this month. This is about the trunk portion of the plant, and the possible derivations played by the trunk when you are dealing with an SMATV or private cable situation.

HOW SMATV Differs from CATV

The CATV system headend may be almost identical to the SMATV headend; they might elect to use the same type of off-air receiving antennas, the same type of off-satellite antennas and electronics. They might even elect to use the same type of modulators and other headend equipment. If that were the case, then the signals leaving the headend in the trunk cable from each would, in theory, be identical.

The CATV system designer will know in advance just how far he must 'stretch' his cable service, using his trunk line as his main artery, **to reach the far edges of his franchised area.** The SMATV operator will also know how far he must stretch his cable plant to reach the edges of his contracted property. Here is the first major difference:

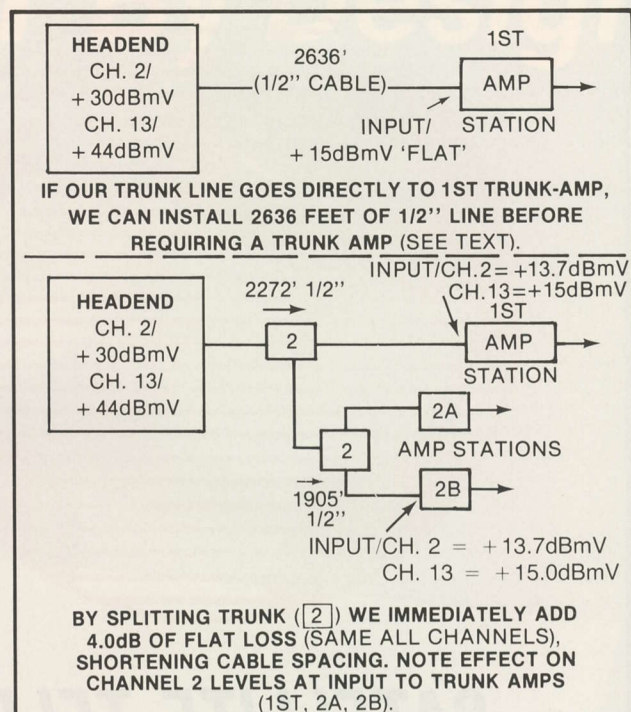
- 1) The cable operator will probably have to travel **miles** (tens of miles) in cable to take service to the edges of his service district;
- 2) The SMATV operator may have to travel **thousands of feet**, or perhaps a mile or two at most, to his most 'distant service point.'

The difference between 'thousands of feet/a mile or two' and 'tens of miles' is very significant. The SMATV operator will never need to be concerned about reaching the end of his territory before he has generated so much noise and interference in amplifiers that he will be degrading the service channels with 'system-made' interference. And that gives the SMATV operator a design 'option' which the CATV operator does not have. It is all about saving bucks.

Let's see how this works in diagram form.

We have a headend and because we come from the CATV school, we have designed it so that it has +30 dBmV output on channel 2 and +44 dBmV output on channel 13 (the uneven outputs are a function of cable 'tilt,' a subject previously covered). Now, if we elect to use a popular brand and model of 1/2" trunk cable, we find that we can send that signal through 2,636 feet of cable before the cable's attenuation has decreased our in-cable service level to +15 dBmV. The +15 dBmV is an important number because we have learned that a quality trunk amplifier must have a specified input when we re-amplify it.

But suppose that our trunk is not simply a 'straight shot' through cable to the next amplifier station; it is a trunk system which must be



'split up' along the way to create sub-(trunk)-arteries to send signal down other streets or alleyways in the community. In other words, the trunk has to split because the people live in several directions (not just one) from the headend. The 'splitting' of the trunk signal causes us to lose some of the signal. In the real world, each time we split the signal (divide it in two) we lose around 3.5 (to 4.0) dB of trunk signal 'strength.' Another way to look at that 'trunk loss' is to ask ourselves 'how much 1/2" cable is the equivalent of losing 3.5 (4.0) dB?' **There is a numerical answer.**

So in the bottom of our diagram we see that if we add a trunk line splitter someplace between the cable headend and the first amplifier station, we have just effectively shortened the distance from the headend to the first (required) amplifier (station). The cable length is now 2,272' rather than 2,636'. In effect, we lost more than 350 feet of 'cable' ability in the process of inserting a splitter in the trunk line.

To further illustrate what happens, below the splitter inserted in the main-artery (top line) run, we also have taken the **first** two-way split and we have **split it again**. This is not uncommon in the CATV world. Now we have not one but two 'bulk signal losses' in the trunk line. In the top trunk run we dropped from 2,636 feet to 2,272 feet of cable **prior** to our first amplifier. In our bottom example, the second splitter got us down to 1,905 feet (all distances are measured from the headend output fitting to the input fitting on the trunk line amplifier).

There is one more point to notice.

In our top example, we had arrived at the 2,636 foot point with both channel 2 and channel 13 'equal,' both had attenuated to a signal level of +15 dBmV due to the fact that the cable has higher (greater) losses at channel 13 than at channel 2. Now however the cable is shorter than in our original example so we can reasonably expect the difference between the channel 2 and 13 signals to also be something other than 'even.'

If we left our headend operating with +44 dBmV output level on channel 13 and +30 dBmV output level on channel 2, as in our original example, we would now find that in all three indicated trunk amplifier locations (1, 2A and 2B) we have **more signal on channel 2** than we have on channel 13. The reason, just stated, is obvious; it took 2,636 feet of cable for the higher loss of channel 13 to balance to the lower loss of channel 2; resulting in both channels reaching the amplifier even though they started out in the headend with channel 13 **14 dB higher**. If we shorten the cable, but leave the headend output levels still at 2/+30 and 13/+44, we can expect channel 2 to now be

stronger at the input of the respective amplifiers (1, 2A and 2B). It is, by as much as 1.3 dB.

The answer is to turn up the channel 2 level (or turn down the channel 13 level) at the headend; we'll explore that further, shortly.

Now let's look at our first example of how we save money in SMATV. And get the jump on a local cable system operator.

NON-PURE Trunk

Remember that we don't mess-with-the-trunk because we know, in CATV, that the trunk is our 'main artery' or lifeline carrying signals to the furthest extreme of the community. But if our furthest extremes are **quite close**, why must we adopt a CATV-like-system of main arteries and sub-arteries or freeways and exits, at all?

Each generalized plant design choice will depend upon the size and scope of the facility or region to be covered. There is no hard and fast rule that tells you that you 'must' use CATV wiring specifications when the plant is larger than XX miles but that you can use SMATV type techniques when the plant is smaller than Y miles. It is not that simple; quite.

There is a technique here called 'tapped trunk' and we have a diagram to illustrate the principle. It recalls that the pure trunk was able to send the bundled headend signals through 2,636 feet of 1/2 inch trunk cable before we reached the first amplifier station. That's a review; the bottom on the diagram is the 'new stuff.'

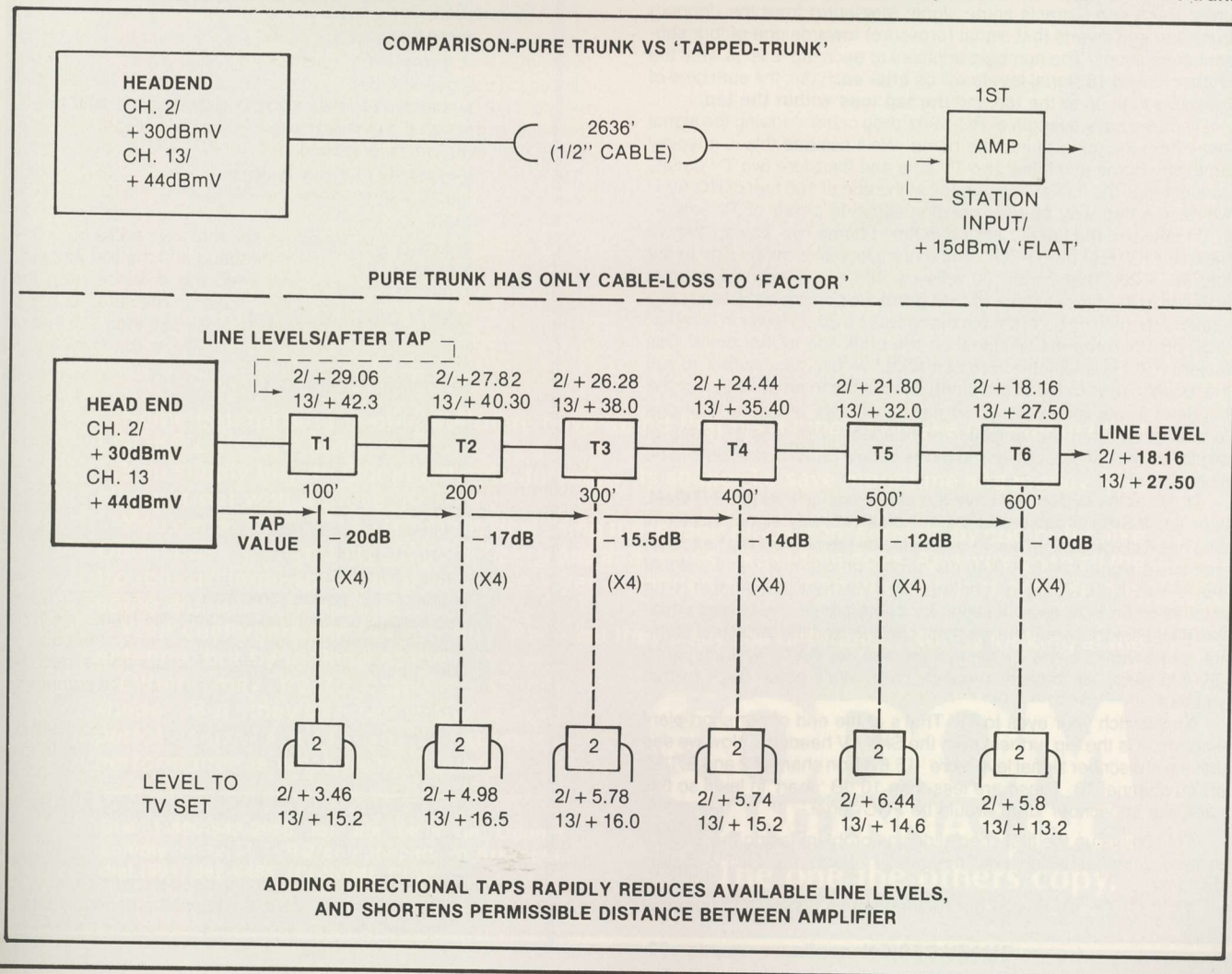
Suppose we start to service customers right out of the headend (say within 100 feet) and we decided to (horror of horrors!) **tap the trunk**. In other words, we violate the first rule of good CATV plant design and we insert a cable tap-off device (directional coupler) into the 1/2 inch trunk cable. What really happens here?

If our total plant length is short; if we know, for example, that we can reach the outer limits of our cable property within say 2,500 feet of cable from the SMATV headend, why not simply run a single 'cable' and avoid the added expense of running a trunk plus feeder lines? Certainly anytime you are installing two cables (one as a trunk and one as a feeder) along the same stretch of roadway or easement, you are spending more money than if you were installing but a single cable. Can you make one cable serve you twice; as a trunk AND as a feeder? The answer is yes, if you are careful.

The level problem first. In the bottom of our new diagram we have inserted directional taps at 100 foot intervals starting 100 feet from the SMATV headend. The taps are a popular GI/Jerrold tap-off, CATV grade quality, and each of the tap-off devices has four separate output spigots. That means that you could connect-up **four** homes or four apartments or four condos **at each location** where we have shown a 'tap.' What happens when we do this?

In our trunk-only system we have no loss along the cable **but the loss of the cable itself**. We understand 'that loss' since all cable has attenuation. In our 'tapped trunk' we have this cable loss **PLUS** we also have loss caused by the directional tap services. Therefore we have a 'sum loss' made up of two components. We can calculate the loss in the cable proper at both channels 2 (our lowest channel) and 13 (our highest and therefore 'most lossy' channel) and **to that loss** we must **add** the loss of the directional tap. Think of the tap in this way:

The cable channels on the trunk have a measureable 'voltage' or 'pressure' each. The directional tap is like a very small piece of tubing inserted into a watering system. A small (fractional) amount of the signal 'pressure' (voltage) being carried on the trunk line siphons off of and out of the trunk



into the 'small tubing' (the directional tap). You can measure that difference in pressure (signal voltage) before and after the tap; it will be slightly lower just after the tap than it was just ahead of the tap because some of that pressure or signal voltage has flowed into the directional tap and to the homes connected to the directional tap.

So now as we go 100 feet/200 feet/500 feet and so on down the 'tapped trunk' and away from the headend, we have both the loss of the cable (attenuation) plus the loss of the tap (siphoned off 'pressure') adding up. This means that just as we had to shorten the trunk run from 2,636 feet to 2,272 feet when we inserted a two-way splitter in the line in our 'pure trunk,' we now have to shorten the tapped trunk run to some even shorter distance to allow for the insertion of the directional taps.

There are several factors here at work, simultaneously:

- 1) The cable losses are higher at the higher frequencies (ie. channel 13 losses are higher than channel 2 losses in a given length of cable);
- 2) The directional tap 'losses' are ALSO higher at the higher channels.

Therefore in a given length of tapped trunk, channel 13 will get 'weaker' considerably faster than channel 2. But, remember that we started out at the headend with channel 13 at a level that was 14 dB stronger than channel 2; so we could end our first-leg journey, at the input to the first real line amplifier, approximately 'equal' between 2 and 13. So what happens at those cable subscriber homes 'close to' the headend? Won't channel 2 be far weaker than channel 13?

Your attention is drawn to the fine print in the diagram. Note that we have T1, T2 and so on to T6. These are directional tap-offs units. Each one extracts some signal (pressure) from the (tapped) trunk line and diverts that signal (pressure) towards one of four subscriber locations. The numbers adjacent to each tap tells us what the channel 2 and 13 signal levels will be after each tap; the sum here of the cable loss up to the tap, and the tap loss within the tap.

Then we have a length of RG-59/U 'drop cable' carrying the signal away from the tap and into the home. We'll assume this is a typical American home and it has two TV sets and therefore two TV outlets connected to the cable. That means at the end of 100 feet of RG-59/U we have a two-way splitter needing signal to a pair of TV sets.

In between the tap (T1, etc.) and the in-home two-way splitter we have the 100 feet of RG-59/U and a number with a minus sign to the left; ie. -20. That minus 20 tells us that the directional coupler installed in the tapped trunk at that point was designed to result in a signal siphoning through the tap that would be 20 dB lower in level (ie. -20 dB) than the actual signal on the trunk line at that point. This factor (-20) is a variable; you can select various tap 'values' to suit the location of your tap in the plant; a tap close to an amplifier, or the headend in our example, would siphon off less pressure than one further away from the amplifier or headend. Not less in terms of signal-to-the-TV-set, but less in terms of how much is available to be siphoned off.

Down at the bottom we have the actual signal level to the TV set, after the RG-59/U cable and the in-home two-way signal splitter (it also has 4 dB of loss). In our T1 example, the tap nearest the headend, we have a signal that is +3.46 dB 'strong' on channel 2 and a signal that is +15.2 dB 'strong' on channel 13. If you recall the August issue discussion on FCC specifications for cable plants, the largest variation they allow between the weakest channel and the strongest channel, as delivered to the TV set in the home, for CATV systems, is 10 dB. Obviously we have a problem here. We'll come back to that problem.

Now switch your eyes to T6. That's at the end of our short plant diagram. It is the tap furthest from the SMATV headend. Now we see that the subscriber signal levels are +5.8 dB on channel 2 and +13.2 dB on channel 13. These are less-than 10 dB 'apart' in level so this particular subscriber 'drop' would be FCC 'legal.'

This points up the first special design problem facing the SMATV system designer which only marginally affects the CATV system designer:

- 1) In CATV, we design our headend output level, and our trunk

SMATV DESIGN/ continues on page 50

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SMATV DESIGN/ continued from page 48

amplifier output levels so that we arrive at the **next** amplifier station with an input signal region which matches the recommended input levels of the trunk amplifier in use. This is only a modestly difficult situation because we are fighting only 'cable losses' in this design, and the cable losses are known.

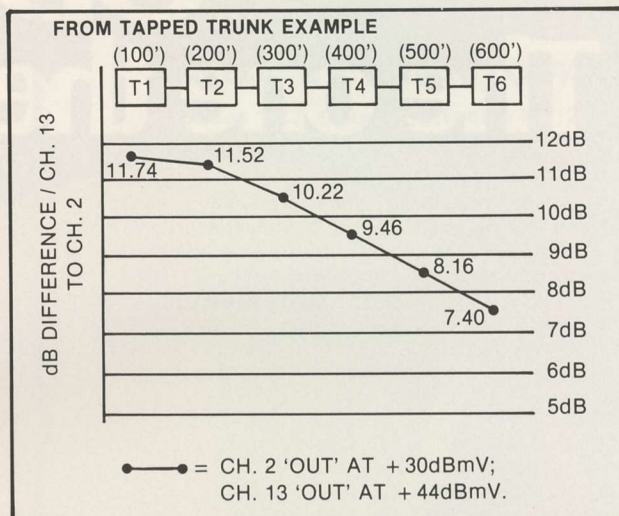
- 2) In SMATV, when we begin to 'distort' the trunk by inserting directional taps in the trunk line, now we have a **'new source' of signal loss** and it is also 'frequency sensitive' (ie. the losses are greater at the higher channels than at the lower channels). **Plus**, now we must be concerned about the level reaching the next amplifier **PLUS** the level reaching every single subscriber along the way, starting with the first tap that may immediately follow the headend or amplifier and continuing on through to the last tap just ahead of either the end of the line or the input to the **NEXT** amplifier station.

That's a lot of balls to have in the air all at one time. But it can be done if you are sworn to save yourself a grand or more per cable plant mile.

Let's see just how severe the problem might be with one more diagram. And, how if left alone long enough it **begins** to rectify or correct itself. We have a table-graph here that shows only one element of the system; using our original headend output level of +30 dBmV on channel 2 and +44 dBmV on channel 13, **we measure the channel 2 and 13 signal levels** at the end of each subscriber's 'drop line' after their internal two-way splitter. We see that the 'difference in signal level', channel 13 (strongest) to channel 2 (weakest) varies from 11.74 dB at tap one (T1) to 7.4 dB at tap six. That suggests a 'quick fix': **simply raise the channel 2 level by 7.4 dB** in this example and now we would have a maximum difference at T1 of 11.74 - 7.40 or 4.03 dB while at the 'end of the line', T6, the difference would be '0 dB'. Let's see what that does to our other element; the input level to the first trunk amplifier. Remember, this is only the first 'chunk' of our CATV plant; there are more amplifiers and more 'chunks' ahead and we have to somehow keep all of these balls in the air **clear to the end of the system!**

In our **next diagram**, we take the major part of our just-given advice and we modify the headend output level to +36 dBmV/2 and +44 dBmV/13. Recall that when you set up a headend, you 'balance' the levels using the individual carrier level controls on the modulators to suit your system design needs. Raising the channel 2 (3, etc.) levels a few dB is simply a matter of:

- 1) Determining how much 'up' to go, and,
- 2) Connecting a signal level meter to an appropriate test point and

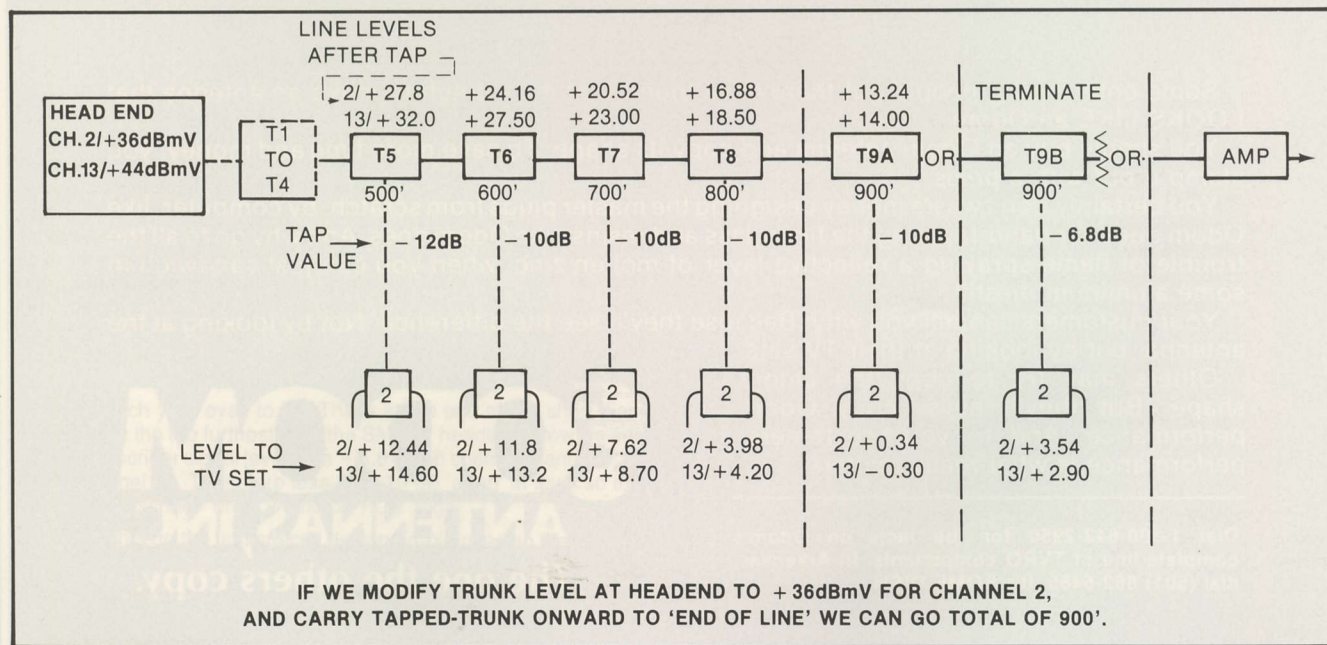


turning the controls 'that amount'.

In our new diagram we have bunched the first four taps into a single diagrammed tap (they are stand alone in the real world) and have begun our detailed analysis **at the T5 location**, some 500 feet down-line from the headend. With +36/2 and +44/13 out of the headend, we now find that the T5 subscriber signal levels are +12.44 and +14.66 for channels 2 and 13. The tap in use here is -12 dB (isolation) and we could have gone to a higher isolation number (such as -17 dB) and dropped both of those numbers by roughly 5 dB. Switch your eyes now to the end of the line; the T9 (A) tap.

Here we have three choices. T9(A) is a 10 dB isolation directional tap which would deliver +0.34 signal on channel 2 and -0.30 signal on channel 13 to a subscriber connection at the end of 100 feet of RG-59/U and past a two-way splitter for the subscriber. The -10 dB isolation tap is about as low as you can normally go, and still go 'on' to another segment of cable. The ± 0.0 dB signal levels for channels 2 and 13 are marginal; very close to the 0 dBmV 'minimum' cable requires.

Let's assume this IS the END of the line; there are no more subscribers and therefore no more cable beyond this point. This gives us another option. If we don't have to carry the trunk line further,



we can simply install a terminating tap; one that 'terminates' or 'caps off' the trunk line at this point. If we elect (and are able) to do this, we can now drop to an isolation value of -6.8 dB (again, using a standard catalog GI/Jerrold tap-off device) and now rather than being plus/minus a few tenths of a dB from 0 dBmV we are in the plus region at the subscriber's set; $+3.54/2$ and $+2.90/13$ to be exact. That's a second choice (T9B).

The other possibility is that we have a new amplifier to feed signal to at this location. Let's see how that works, since it begins our sequence of taps and signal losses all over again!

In our last diagram for this month's segment, we go back and locate that if we were using the T9A selection (last tap in line being a -10 dB isolation tap), we had a signal level AFTER the T9A tap of $+13.24$ dB/2 and $+14$ dB/13. Those are numbers which are very close to the original suggested $+15/+15$ levels for channels 2 and 13 as **input levels** to a trunk amplifier (remember the simplistic cable-only loss with 2,636 feet of cable?).

That means we can go now into a new trunk line amplifier with the .02213.24/2 and $+14.0/13$ input signal level and re-amplify the trunk line signal **before** we begin our **next series** of taps on the tapped trunk. This is shown with a nominal trunk line amplifier gain of just over 17 dB on channel 2 and 22 dB on channel 13. The result, diagrammed, is $+32/2$ and $+36/13$ output signal levels. And now we are ready for the

AN OBVIOUS Point

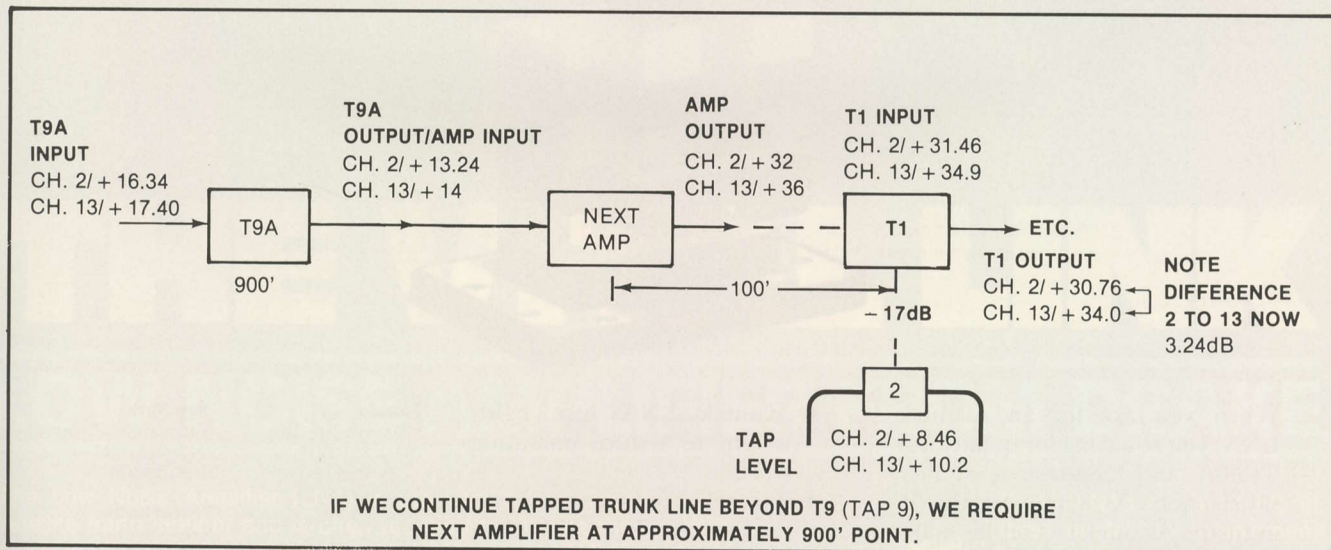
We started this session by comparing what happens in a piece of 'pure trunk' cable when we connect it to a headend with $+30/2$ and $+44/13$ signal output levels. We found that after 2,636 feet of $1/2$ inch cable we were at a cable-level of $+15/+15$ on channels 2 and 13.

We then proceeded to install directional taps in the pure trunk and we turned it into a 'tapped-trunk'. Now we had the cable loss plus the directional tap loss to contend with and as we progressed through that design part we found that we were ready to re-amplify again ($+13.24/+14.0$) after **900 feet of cable** loss plus directional tap loss. And this was AFTER we re-adjusted or headend output level to $36/+44$ to compensate for what was obviously too little low-end (channels 2, 3 and so on) signal voltage level.

This tells us that the pure trunk is about **293% as efficient** as a tapped trunk; using the particular $1/2$ inch cable we have selected; and placing four-way directional taps at 100 foot intervals through the trunk run.

So there is an obvious trade-off at play here; you can go further, **always**, in a 'pure trunk' but you **can serve people along the way** 'for a price' if your total plant length (greatest distance from the headend to the last subscriber location) is relatively short.

A few closing words about selecting amplifiers for this application. We earlier noted, reference feeder lines, that most 'line extender' type



first directional tap **AFTER** the next trunk line amplifier.

Note that as we start this next sequence, we are doing two things:

- 1) We are at a level that is significantly lower than our headend, at the output ($+32$ versus $+36$ at channel 2; $+36$ versus $+44$ at channel 13). This is because we will usually be utilizing trunk line amplifiers with far lower output capabilities than we have built into the headend. There are exceptions to this rule, but we'll slide past them for now.
- 2) The difference between 2 and 13 is now 4 dB ($+32$ and $+36$) rather than 8 dB ($+36$ and $+44$). This is because we will not be able to travel through 'as much trunk cable' on our way to the **second** trunk amp as we traveled through on the way to the **first** trunk amp; with the overall trunk amp output level **LOWER**, we cannot go as far before we will require our **THIRD** trunk line amplifier. With less distance to go, the difference between the highest frequency channel ($+36$ dBmV) and the lowest frequency channel ($+32$ dBmV) will be less (shorter cable, less cable-tilt loss to compensate for).

Now notice where we are with the subscriber tap-off level, as delivered to the TV receiver(s) through the standard 100 feet of RG-59/U and the on-premises two-way splitter. It says we will have $+8.46$ dB/2 and $+10.2$ dB/13. Those are obviously pretty decent numbers.

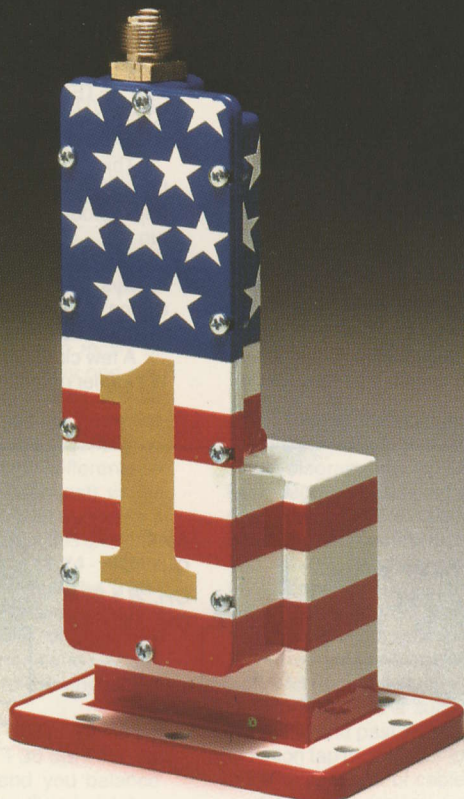
amplifiers tend to be rated such that you can stick three (or perhaps six if you keep your output levels turned down) 'in a row'; called cascading of amplifiers. Beyond 3 (or 6) you will have so much noise and interference contribution from the amplifiers that you will be 'wallowing' in both along with the signal; and customers cannot be expected to pay for cruddy pictures. You could design a plant up to say three amplifiers deep (i.e. the longest leg to the furthest subscriber would have no more than three amplifiers on it) **using line-extender grade amplifiers**; and probably come out OK with the tapped trunk approach. Such line-powered amplifiers, capable of handling 12/20/36 or whatever number of channels are in the \$200/\$300 price region, and even lower if you shop around for 'bargains'.

There is another approach; you elect to use the **higher grade** (lower noise and lower cross modulation/composite triple beat interference level) **trunk amplifiers** in your plant. Now you can go several dozen 'deep' if that is required, tapping the trunk all along the way, or shifting alternately from 'pure trunk' to 'tapped trunk' as you go. This costs **more per amplifier** (two to three times as much per amplifier 'station') but it gives you better service and greater 'cascadeability' in the process.

If you study the facts and design your own plant, you will come to

NUMBER 1

For a Lot of Good Reasons



When you ask for an Avantek LNA, you're asking for quality, reliability and long-term customer satisfaction. As a pioneer in the industry, Avantek has set the standard for LNA performance.

That fragile satellite signal needs very careful handling on the way to your customer's receiver. You can't get any more out of a picture than what you start with. An Avantek LNA at the antenna assures your customer of the finest quality reception possible. And it guarantees you peace of mind.

Consider:

- Avantek builds all of its own GaAs FET transistors for complete control of quality and delivery.
- Avantek LNAs have a wide range of noise figure selection to match the application.

- Avantek LNAs are lightweight to reduce mounting stress.
- Avantek LNAs meet or exceed specifications. ALWAYS.

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Longs Electronics
(800) 633-6461
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California
Echosphere Corp.
(916) 381-5084
(800) 338-5477
(800) 338-5478 (CA)

Colorado
Echosphere Corp.
(303) 935-1909
(800) 521-9282

Florida
Southeast Sat. Dist.
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829-5434
(800) 824-3474
National Sat. Comm.
(305) 851-4738
(800) 821-8659

Georgia
Kelgo Intl.
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(800) 282-6070 (GA)

Indiana
Hoosier Electronics
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(800) 457-3330

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New York
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(800) 833-4485

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South Carolina
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(800) 922-9704 (SC)

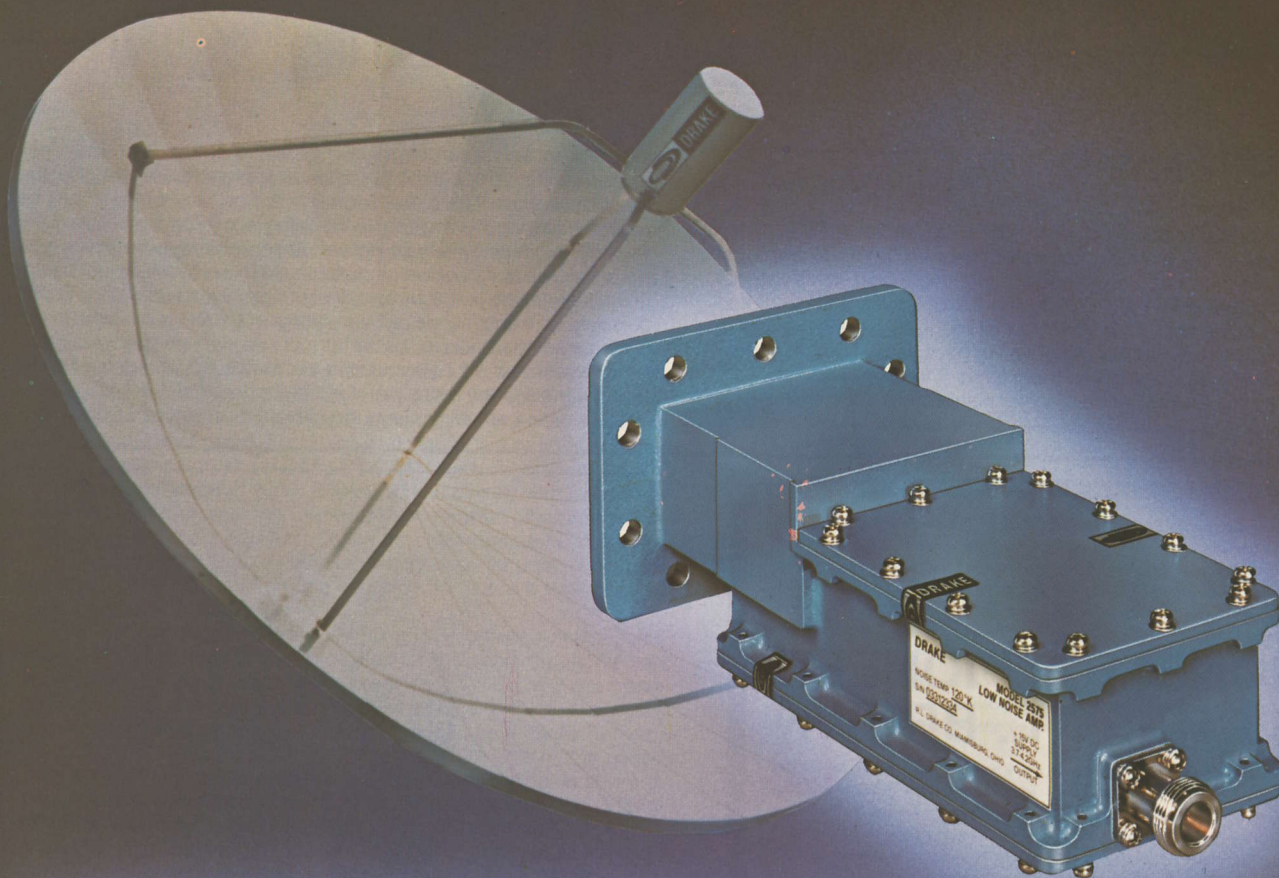
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Avantek

Milpitas, California

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THE VITAL LINK

LOW NOISE AMPLIFIER FROM DRAKE

The Low Noise Amplifier (LNA) is the vital link in your satellite earth station, and is often required to tolerate the most demanding environmental conditions. The LNA is probably the most electrically-sensitive component in your system. This means you should take exceptional care in selecting the LNA which will maintain the high performance standards you demand.

Drake LNAs feature an integral bandpass filter and ferrite isolator to reject interfering signals and provide maximum efficiency. Each Drake LNA is tested to assure a nominal 50 db signal amplification under all operating conditions. Conservative noise temperature measurements assure you of a LNA which meets its specifications on all satellite transponder frequencies.

Drake LNAs are environmentally engineered to withstand the elements. Every Drake LNA is supplied with an individual performance report of noise temperature and gain parameters. Most of all, Drake LNAs are built with traditional Drake quality and backed with Drake's famous customer support.



Drake LNAs are available in three models to complement your antenna selection, signal strength footprint, and receiver requirements.

R.L. DRAKE LOW NOISE AMPLIFIERS

MODEL NUMBER	WORST CASE NOISE TEMPERATURE	GAIN (nominal)
2575	101 to 120 degree K	50 db
2574	86 to 100 degree K	50 db
2573	85 degree K or better	50 db

Chances are you'll specify a Drake satellite receiver, too! We're dedicated to making your earth station picture sharp and clear. The R.L. Drake Company has produced quality communications products for more than forty years. Demand a Drake!

See your local Drake dealer or contact us for further information.

R. L. DRAKE COMPANY



540 Richard St., Miamisburg, Ohio 45342, USA
Phone: (513) 866-2421
Telex: 288-017

PIONEER MEMBER OF
SPACE

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SMATV DESIGN/ continued from page 51

your own logical conclusions. Many times you will 'layout' the plant a half dozen times or more, on paper, before coming to the 'right solution'. Each time you change an amplifier type (and specifications) you will find yourself recalculating the plants losses and gains and relocating equipment. This is all time well spent, although you can also go to an equipment supplier (Blonder-Tongue Labs, GI/Jerrold, Channel Master, Winegard) and ask them to do it for you. They may do it 'free' (in exchange for your buying your plant equipment from them), or they may charge you a modest fee for the service. If you take your

rough plant 'layout' to two or more such suppliers, you may well receive back several completely different approaches to laying out the exact same plant. There may be only one 'best way' or there may be several equally good ways to do the same job. If you handle the work yourself, after some study and lots of kitchen table layout practice, you will always be ahead of the game because then you will select equipment based upon just your own design objectives and not the 'sales objective' of a commercial system designer (yes, it is possible to get back a plant that calls for using far more equipment than you really need; **remember** a free layout is **in exchange** for your using **THEIR** equipment and the more you use, the better THEY like it!).

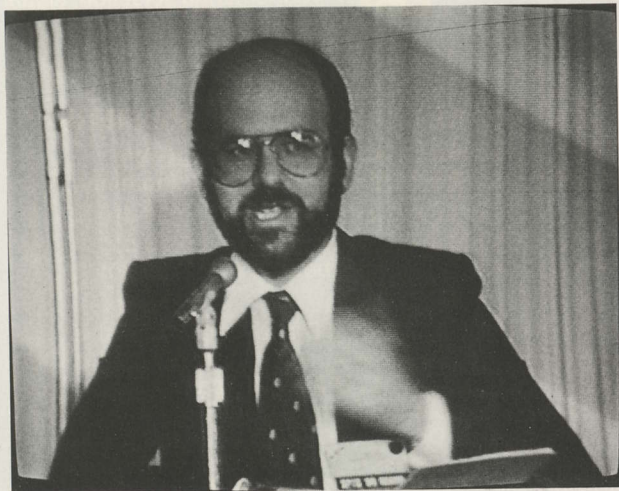
This series will continue in the November issue of CSD.

PIONEER'S PIONEER/ RICHARD L. BROWN

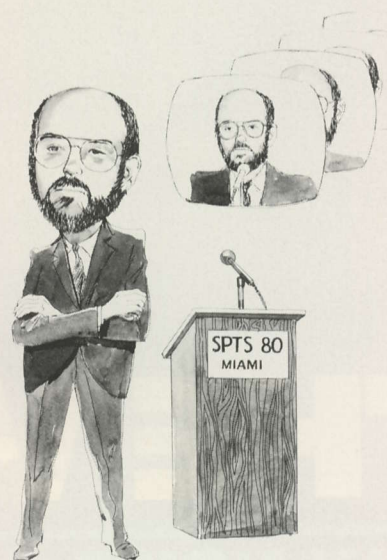
PIONEER Number Three

In our July issue of CSD we identified **Robert Coleman** of Traveler's Rest, South Carolina as a major contributor to the new technology of TVRO in the industry's formative year(s). In our August issue we identified **Robert Taggart** of Chaparral Communications as having made a major contribution to the art and science of TVRO antennas, way back in the period 1970-1972! Both become a part of the TVRO 'Hall of Fame.' Seven "Pioneer's Pioneers" are to be identified in all and for each there is a handsome 11 by 14 lithoprint available, free of charge, to TVRO dealers.

During July and August we have been holding a concurrent 'contest' which allowed dealers to 'guess' who all seven Pioneers will be. Those correctly guessing all seven, or if nobody does so, those closest to correctly guessing all seven, will have their entries in our



BROWN/ appearing at the Miami SPTS event to urge that the industry 'get together for the battles sure to come.' They came, and belatedly, we did get together.



mini-contest placed into a hopper. From that hopper, by random drawing to be held on September 3rd, some entrant will win an all expense paid vacation for two people to the Turks and Caicos Islands in the Caribbean; **courtesy of Boman Industries and WIV-TV.**

Those who are reading this while in Nashville, or just prior to the Nashville joint SPACE/STTI show, are invited to attend the all-industry Fifth Birthday Party being held at 6 PM on Monday September 3rd during the SPACE/STTI show. You are also invited to go by the Boman Industries booth [544/546] or the CSD publication booth [1012] on opening day, September 3rd, for a 'final opportunity' to participate in the contest.)

KEEPING Us Out Of Trouble

This industry was 'in trouble' before there was an industry. Historians recognize the formal start of the home TVRO industry as **October 18, 1979**; the date when the Federal Communications Commission 'deregulated' home TVRO systems and allowed the industry to grow at its own, unencumbered rate. There was at least the seed of an industry prior to that date. For example:

- 1) The first issue of CSD came out on September 28, 1979; 20 days before the FCC 'freed up' home TVROs;
- 2) The first public-press appearing about TVROs came out in mid-October 1978, an article written by Coop appeared in TV GUIDE publication in both the U.S. and Canada and more than 10,000 pieces of mail arrived in Coop's mailbox as a direct result;
- 3) The first network television coverage on our industry appeared on October 30, 1978 when the CBS (Cronkite) Evening News portrayed Coop's pioneering home terminal in a special report. Another 10,000 pieces of mail for Coop . . .

... and finally, and most important,

- 4) The first all-industry trade show, **SPTS-79**, was held in Oklahoma City in August of 1979 and 506 official registrants attended three days of the most intensive lectures, demonstrations and panel discussions this industry has ever seen.

Through all of this, this "Pioneer's Pioneer" has been 'there' to help us keep out of trouble. His name is **Richard L. Brown**.

Brown is an attorney, residing and working in the Washington, DC area. We first met Brown in 1975. He had recently left a job with the Federal Communications Commission where he was one of a four-lawyer task force charged with the responsibility of drafting rules and regulations for the cable television industry. We were introduced to Brown by a lady named Judy Baer who was active promoting better technical standards and training for CATV system personnel.

From 1976 through 1979, Brown worked closely with Coop (and vice versa) on behalf of the **Community Antenna Television Association**, a national trade association for cable operators. We spent hundreds of hours together working out strategy for presentations to Congress, the FCC and on one occasion, to attend a White House Conference on Cable.

When Coop installed his first TVRO in 1976, he was editing a cable television magazine (**CATJ**) published for the cable group. He had been championing the concept of unregulated TVROs for more than a year, and then, like now, he wrote things as he saw them. There was no way his own, **private**, terminal was going to be a 'secret' for very long. The FCC routinely required licenses for TVROs in that period and they only found regulations allowing them to grant licenses in specific use areas; **such as** cable and broadcast stations. '**Home TVROs**' were not in that classification. So the law said you had to have a license, but the fine print in the regulations did not allow you to apply for or be granted such a (home) license.

With Brown's assistance, the first Cooper terminal was licensed under an obscure provision that allowed for 'experimentation.' The FCC granted this license to Coop reluctantly; another would be granted to Ted Turner in time. Very few others would ever be granted.

When the first SPTS event was ready to open, Coop needed

Society for Private And Commercial Earth Stations

1521 O Street Northwest
Washington DC 20005
(202) 387-1856



August 15, 1980

MEMBERSHIP BULLETIN

MESSAGE FROM THE BOARD OF DIRECTORS

The month of July has been extremely active and crucial to the goals of our organization. As you are undoubtedly aware, our organization was given substantial time in San Jose at Bob Cooper's (Coop's) Satellite Private Terminal Seminar to discuss the organization's objectives. A Board Meeting was also held at San Jose and we are very pleased that Professor Taylor Howard of Stanford University has submitted to a genuine draft and has become President of SPACE. His knowledge of the industry, the technical aspects of satellite communications and his stature in the community certainly will be a tremendous asset to the organization. Attached is a copy of a list of the Board of Directors, together with their addresses and telephone numbers.

By unanimous vote, the Board approved a new dues structure for SPACE. Individual memberships are \$25, corporate or business memberships are \$100, and a new category of sustaining memberships for both individuals and corporations or businesses has been created, which is a \$500 membership. The sustaining members will automatically have a voice on the Board of Directors and will be entitled to certain privileges of being identified as sustaining members in SPACE publications. For those of you who have originally signed up in a category that no longer exists, if your dues structure is now lower you may seek a refund by writing us - no questions asked. However, because of the frenzy of activity now taking place in Washington which greatly affects our well-being, the Board has stated that contributions in excess of membership dues are needed and welcomed. We think you will agree as you read on.

Brown's assistance once again. Less than 72 hours before SPTS was to begin, a federal marshal knocked on Coop's Oklahoma door and served him with papers. He had four hours to round up his defense and appear before a federal judge; the charge? That his SPTS show was designed to '**teach people how to steal privately owned microwave signals**' (!).

Brown, although 1,100 miles away, orchestrated the Cooper/SPTS defense by telephone. Coop won in court, without an attorney present. The opposing side, the nation's MDS trade association, wanted the show shut down before it began. They had attorneys.

During SPTS, the attempt to close down the show through a federal court judge was much discussed. The threat that the industry was going to strangle before it was born was real. An emergency meeting during SPTS determined that there **should be** a national trade association. Several people volunteered to get it started. **But nothing happened.**

The next national trade show was in Miami, Florida and it was held early in February (1980). Richard L. Brown was invited to attend and participate. Videotapes of that show's seminars reveal he did an excellent job of explaining ALL of the terrible things that **might happen** to shut down the industry. **He accurately foresaw:**

- 1) The introduction of **federal legislation** to outlaw TVROs;
- 2) Dealers being taken into **court** for selling TVROs;
- 3) Bars and commercial establishments being charged with the violation of US **copyright** laws;
- 4) The stopping of **exporting** TVRO hardware outside the USA, and,
- 5) The eventual **scrambling** of TVRO premium-programmed signals.

The trade group meeting in Miami got back on the trade association track. A man named Gene Martin, who had begun an antenna manufacturing operation in Louisiana (Star Antenna) was selected to head up the membership drive. Dozens of others volunteered.

But once again the effort ground to a halt as those who were members of the industry found themselves so swamped with getting their own manufacturing facilities operating that self-defense seemed like a low, second priority. Besides, there were no 'direct threats' to

FIFTH BIRTHDAY CO-SPONSORS

The following firms are helping to co-sponsor the **TVRO Industry Fifth Birthday Party**, scheduled for Monday September 3rd at 6 PM in the **Washington Ballroom** at the Opryland Hotel:

- 1) Boman Industries
- 2) BR Satellite
- 3) California Amplifier
- 4) Channel Master
- 5) CSD/Coop's Satellite Digest
- 6) Delta/Draco
- 7) Intersat
- 8) Paradigm Mfg., Inc.
- 9) Uniden
- 10) USS/Maspro

Tickets for the event are **required** although there is **no charge for the tickets** (seating is limited!). Tickets are available (as long as the supply lasts) at the exhibit booths of the co-sponsor firms. The party room opens at 5:45 PM and everyone must be seated by 6:10 PM. The 'program' will be over at 7:10 PM. Additionally, you may submit one 'last minute guess' of the identity of the 'Seven Pioneers' to be named at the party at either the Boman or CSD booths up to 3 PM on September 3rd. The winner (of an all expense paid trip for two to Provo this winter) will be selected at the close of the party program.

Compare for yourself...

OURS THEIRS

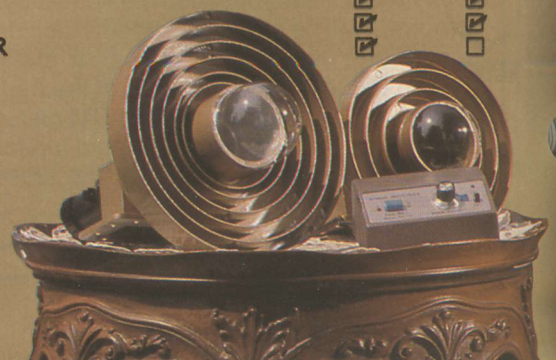
1. Insertion Loss at worst point
2. 5 YEAR WARRANTY
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6. VSWR Compensation Cap
7. Factory terminated cable ends
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10. Painted casting
11. Angle Adapter included
12. Automatic Interface Control - Outside access
13. Built-in Interface circuit
14. Interface patchcord
15. Quick-Connection Terminals on control
16. On/Off Switch
17. On/Off Lamp
18. Vertical Polarity lamp
19. Horizontal Polarity lamp
20. Skew adjust
21. Built-in Transformer in control
22. Angle Fine Tuning adjustment - Outside access
23. Complete mounting hardware
24. 3-way mounting pattern
25. TOLL FREE TELEPHONE NUMBER

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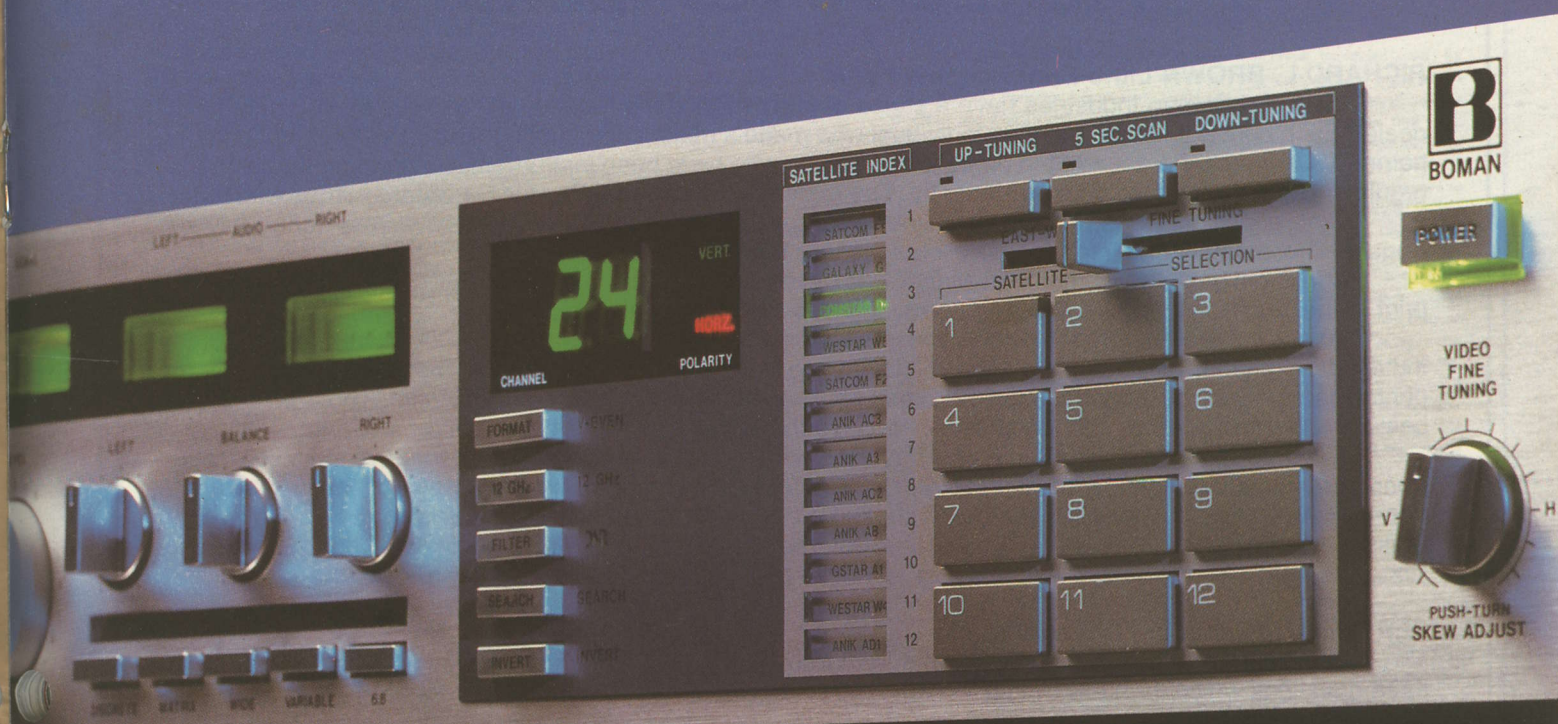
5 Year Warranty



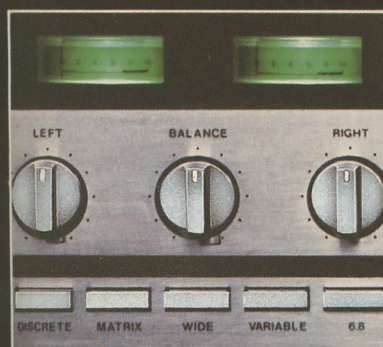
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ALL IN ONE



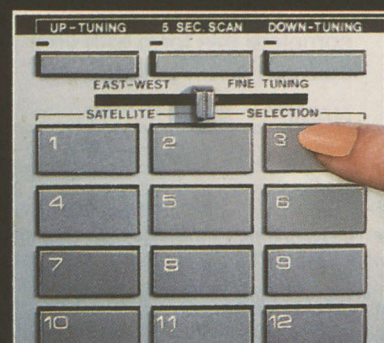
STEREO SATELLITE RECEIVER



The **AUDIO GROUP** provides superior *Stereo* reproduction to ensure viewer satisfaction.



The removable **SATELLITE INDEX** assures constant Satellite identification while viewing.



The **SATELLITE SELECTION GROUP** provides dish movement and fine tuning along with channel selection and 5 second scan.

WHO ARE THE INDUSTRY'S SEVEN "PIONEER'S PIONEERS"?

(*)

RICHARD L. BROWN Litho-Print Request Form:

CSD and Boman Industries have a series of **eight** "Pioneer's Pioneer" litho-prints for you, the TVRO dealer. Each print is a caricature of an individual who made a major contribution to the initial foundation for the home TVRO industry. Seven of the prints are of people who have been instrumental in creating the technical, regulatory or legal framework of **our** industry. The eighth is of the God-Father of Satellites; **Arthur C. Clarke**.

Litho-prints for Robert Coleman and Robert Taggart were announced and made available during July and August. This month's print is of industry legal pioneer **Richard L. Brown**.

Additional prints will be made available, one per month, through January of 1985. At that time the eighth print in the series, featuring Arthur C. Clarke, will also be made available.

To collect the full set of 8 prints, you must complete **this form monthly** in CSD and return it to Boman Industries. Boman is picking up the costs of distributing these prints to the industry. There is no charge for the prints although you must complete an individual print-request-form for **each** monthly print. Those who do this between July and January will automatically receive the Arthur C. Clarke print as a 'bonus-print.'

The original artwork for these prints, commissioned by **CSD**, will ultimately be placed in a suitable location where the entire industry may enjoy the history of our industry. All litho-prints are 11 by 14 inches in size and designed for frame-mounting in your TVRO showroom. All prints are serialized and when the initial (and only) press run is completed, the printing plates are destroyed. There will only be one 'original set' of TVRO industry litho-prints and we hope that ultimately they will have more than intrinsic value in the industry.

SEPTEMBER Marketing Questions:

There is no charge for the prints or their handling. However, we request that you complete the following three questions which form this month's 'marketing survey' as a part of your request for the Richard L. Brown print.

- 1) Using 100% as a number which represents the business your TVRO dealership did during August 1983, assign a number for 1984's business for the same month: _____ %
- 2) Using 100% as a number which represents the business your TVRO dealership did during September 1983, assign a number for what you **EXPECT** September 1984 business to amount to: _____ %
- 3) Please assess what you feel was accomplished as an **important positive-step** at the SPACE/STTI Nashville show just completed: _____

YOUR NAME/ address:

To receive your litho-print of Richard L. Brown, our industry "Pioneer's Pioneer Number Three," please complete this form with your name and address and mail prior to September 30, 1984 to the Boman Industries address given below.

NAME _____

COMPANY NAME _____

Address _____

Town/City _____ State _____ Zip _____ Telco _____

Mail for Litho-Print Delivery Prior to 9-30-84 to:

Birthday Party
Boman Industries
9300 Hall Road
Downey, California
90241

(*/ Find out at 6 PM September 3rd in Nashville; see page 55 here!)

PIONEER BROWN/ continued from page 55

TVRO at that point.

And so the industry came to the San Jose show, in California over the 4th of July period. Now things **had changed**. A Congressman from North Carolina had written and was introducing into the U.S. House of Representatives a piece of legislation. Investigation revealed that HBO was behind the legislation. If passed, **every TVRO in the country would be illegal**. The bill sought to simply outlaw private TVROs; period.

Two emergency sessions were held during the San Jose gathering. Videotape shot of the event again reveals that Brown made an eloquent plea for everyone in the industry getting behind a concerted effort to save the industry from a premature death. **SPACE**, outlined in Miami, **became a reality in San Jose**. Three things were needed:

- 1) Grass roots **support** for killing the proposed legislation;
- 2) On the hill **lobbying**, door to door with selected Congressmen, to explain the position of the new industry;
- 3) Money to **support** all of this.

Brown became the industry's one-man strategist. He brought Taylor Howard to Washington to help with the door to door lobbying (Taylor had been selected by the San Jose group as the industry's first spokesman, and as its first trade association President). Brown, with the help of all of the volunteers in the industry, defeated that legislation. The alternatives were not attractive, since the legislation provided for:

- 1) Monetary fines of **up to \$250,000.00** if you were caught as an individual **using a TVRO** after the bill became law, or, fines to \$1,000,000.00 if you were a business (corporation).

Brown, virtually single-handedly, saved the industry when we needed saving. Yes, dozens, perhaps hundreds contacted their Congressmen and Senators to urge rejection of the legislation. And every such contact played a part in the bill's demise. But it took somebody 'on the hill' talking day in and day out with representatives to seal the bill's fate. **That someone was Richard L. Brown.**

That piece of legislation was the last direct **legislative** attack on TVROs; to date. Its defeat bought us, as an industry, 'breathing room' and the opportunity to perfect our emerging technology. It bought us

SPACE

MESSAGE FROM RICK BROWN
SPACE'S ATTORNEY IN WASHINGTON, DC

On July 2, 1980, Congressman Richardson Preyer introduced a bill, HR 7747, which if enacted would severely curtail the manufacture, sale and use of private earth stations. Normally, a bill takes a considerable period of time to get through the Congress and enacted into law . . . going first through a subcommittee, then a full committee, oftentimes with hearings by the committees and "mark-up" sessions where amendments are offered. Finally it goes to the floor of the House in which the bill was introduced. The Preyer Bill did not go through this elaborate procedure. There were no subcommittee hearings on the bill; in fact, there was no consideration by any subcommittee. Approximately three weeks after introducing his bill, Congressman Preyer simply offered his entire bill, HR 7747, as an amendment to another bill that had already had extensive consideration by the Communications Subcommittee of the Interstate and Foreign Commerce Committee. This Bill is HR 6121 which is devoted exclusively to modifying provisions of the 1934 Communications Act that apply to common carriers, principally telephone companies. HR 6121 now appears headed for the Judiciary Committee and then will be sent to the floor. It is unclear now whether HR 6121 will make it to the floor of the House before the Congress adjourns in early October. It is also unclear as to whether there will be a "lame duck" session of the Congress after the November elections. We are happy to report that we were able to obtain a major modification — discussed below — in Congressman Preyer's bill before his bill was approved as an amendment to HR 6121. However, there were some technical modifications to Congressman Preyer's bill that made it less effective than he desired. Therefore, he is proposing to offer it (HR 7747) as an amendment to yet another bill (HR 6228) that will be marked by the Commerce Committee. If you act now, we are confident that we can make an impact and perhaps change the course of events for the better. Before telling you how you can help, it might be best to describe the background of Congressman Preyer's legislation and what the legislation would do.

the time to mature into a real industry (in the fall of 1980, TVRO parts were still pretty expensive; LNAs were \$750 each, receivers from \$995 up and antennas were close to \$1500 for the 'cheap' models; actuators had not yet been invented!).

Richard L. Brown joins the ranks of "Pioneer's Pioneer" because he made it possible for all of us to be here, today, on the occasion of TVRO's fifth anniversary. Without his effort, it is doubtful there would be an industry today; any kind of home TVRO industry.

TRANSPONDER WATCH

RECENT REPORTS OF ACTIVITY ON DOMESTIC / INTERNATIONAL SATELLITES

Send your reports to CSD Transponder Watch, P.O. Box 100858, Ft. Lauderdale, FL 33310. For late news, call (305) 771-0505.

OAK COMMUNICATIONS has introduced 'Sigma' scrambling; it uses 'sound in sync' digitized audio encryption while removing the vertical and horizontal sync pulses from the video signal. The digital audio goes where the horizontal is normally found; VBI carries the decoding information where the vertical sync is normally found. Each descrambler has its own address code.

NSEN/National Satellite Entertainment Network expanding by acquiring assets of The Pleasure Channel, NBS Video, Satellite Entertainment International and Satellite Home Entertainment. Firm plans \$6-8 million public offering this month to finance expansion of marketing efforts for present Pleasure Channel plus adding additional service channels over next six months.

FUN CHANNEL (Fantasy) responding with 'make your own x rated movie' contest. Prizes to \$2,000 are offered for best 'amateur'

efforts.

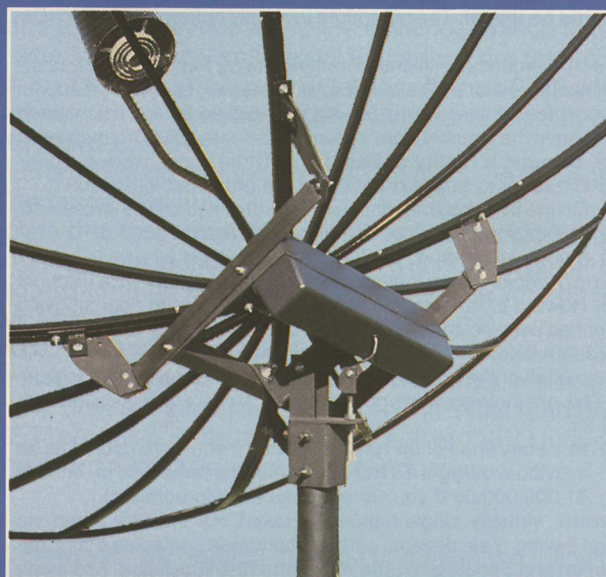
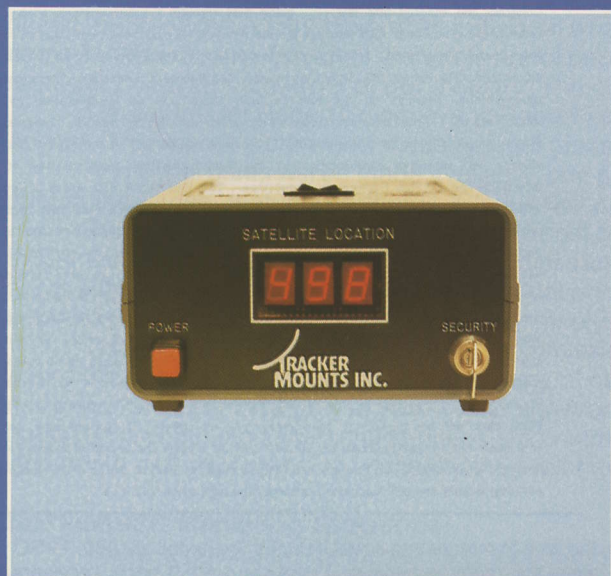
CONTINENTAL Satellite Systems seeks injunction against Hencye Tool and Die charging Hencye is selling Continental developed 'J clip' to Continental competitors, in violation of agreements between the two. Hencye filed counter-claim asking for \$2,937 it says Continental owes it for delivered goods not paid for.

SPACENET 1 has been sold for near-record \$250M to Citicorp subsidiary. Transponders will be leased by banking company to users; Spacenet will remain under operational control of originator GTE. SIN group and Landmark Communications (owner of The Weather Channel) will each share half of vertical transponder 16 (each to receive 36 MHz bandwidth) as latest to sign up; SIN reports they pay \$60,000 per month for half transponder lease on three year term. SIN

TRANSPONDER WATCH/ continues on page 62

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St. Hilaire, Minnesota 56754

TRANSPONDER WATCH/ continued from page 59

will use transponder to downlink news reports from Mexico and other field locations.

CORONET, Belgium DBS bird recently approved, may end up being RCA built. Satellite will have 50 watt TWTA output stages and both Ariane and Shuttle space has been reserved late summer/fall of 1986.

TELSTAR 3C scheduled for launch on 'current' shuttle mission; bird is one of three scheduled but only C band North American in trio. Bird should end up at 125 west and on it will be CBS network programming (multiple channels) if earlier plans hold.

WESTERN Union, following on heels of CBS decision to 'drop out of DBS' has also notified FCC that it will **not build** DBS satellites. WU had four orbital locations staked out; they will return to 'pool' for late comers.

RCA, meanwhile, has asked FCC to consider major changes in its DBS plans, citing determination that 'DBS will grow much slower than anticipated.' RCA wants to go from four satellites of 24 transponders each to a pair with 16 transponders each; dropping power from (unproven) 230 watt TWTA level to 100 watt level. FCC must approve such changes.

COMSAT, meanwhile, has bailed out of SBS (1/3rd) ownership, citing need to cut investment in loss situations and decision to go ahead with another possible loser; DBS. IBM and Aetna, partners with Comsat, will pick up its interest.

SWEDEN, following Luxembourg into privately-owned satellites-for-hire in Europe, has announced a two-satellite system of 28 transponders with initial launch set for 1988. Swedish **government** denies

knowledge of planned service; other European countries do not think it is serious.

MOVIE World is a new Wold service fed to TV stations on T301 daily. Half hour feed intended for excerpt-use by TV stations, TR5 vertical.

NPR future still very much up in air; public radio network's use of satellite has proven very expensive and network is trying to find commercial assistance to reduce operating overhead. Efforts to date have been poorly received.

PANAMSAT, the proposed system to serve Latin America and the Caribbean, has several changes and requests. To get around FCC and US legal problems, they want to sell rather than lease transponder space on board. US policy on leasing has been brewing for 15 months. The satellite firm now wants to modify uplink beams proposed to substitute one gigantic uplink access beamwidth in lieu of three separate spot-up-link beams originally proposed. They also wish to modify one of the downlink beams, moving it from eastern US coverage to eastern US + Caribbean, as far as Barbados. A Hughes bird, with 24 C band and 12 Ku band transponders is planned.

S/A, suffering some financial setbacks in recent quarters but on the road to dollar recovery, won a corporate victory when employees voted NOT to back efforts to unionize the Atlanta facility. AFL-CIO had cited Scientific Atlanta as 'number one organizing target' for high-tech firms in southeast.

PLAN to use NASA TRDS satellite to link US and Europe, through 'independent' contractor Systematics General Corp., has come fire; GTE Spacenet and others have filed formal complaints. It is not likely SGC will be able to bring off this effort because of intense opposition from commercial interests.

COMSAT's latest plan, now before FCC, would reduce to a single orbit spot (110 west) their in-sky DBS location, at same time make six channels available from that location on CONUS coverage. STC has been unable to raise partner in program and needs to trim initial costs to fund it alone. With six channels from 110, CONUS coverage, STC could 'launch' service (1986 projected) to dishes in 2 to 3 foot region nationwide. FCC must (and will) approve.

RESCUE of mis-directed Palapa B and Westar 6 still 'alive' and has tentative Shuttle schedule for early November mission. Plan now is to rescue both satellites, returning them to earth for overhaul and re-use. Both failed to achieve proper Clarke orbit during Shuttle launch early in February.

LEFT HAND circular polarization has been assigned to USSB DBS aspirant on six channels (2, 4, 18, 22 and 30) at 101 and 148 west. FCC has also assigned COMSAT's STC service to LHC polarization.

SBS K band bird at 89 west will be temporarily moved to either 101 west or 110 west to allow COMSAT's STC to begin temporary-pre-DBS service using SBS bird. Original early-STC-DBS was scheduled for fall of '84 start-up; now seems likely to be early '85 at best.

JAPAN's back up bird, BS-2B, originally scheduled for February ('85) launch will not fly until better data is available pinpointing cause of two transponders that failed on BS-2A. Japan would like to have the next generation, BS-3 series, DBS satellites (scheduled for 1989 launch) use solid-state power amplifiers rather than the unreliable TWTA tubes.

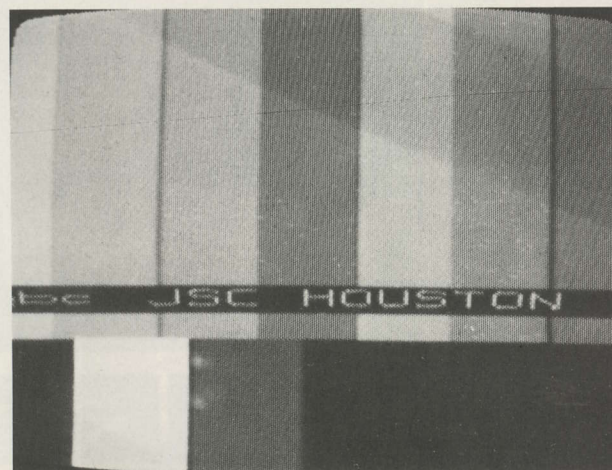
ARIANE 3 launch early in August placed new French Telecom 1A bird into orbit where testing should shortly be noted at 10 west.

PAKISTAN talking with European and US satellite suppliers about investing in domestic satellite system. Project presently in economic feasibility stage.

ARABSAT 1 finally delivered for November blast-off on Ariane rocket; bird ran two months behind schedule to Ariane and launch date may slide as a result.

SBS now offers 45 minutes K band teleconference time between Chicago, Hartford, Washington and San Francisco for flat \$775; user comes to Aetna Life office facility in each to use 'teleconference center'.

CABLE television explosion in Japan is forecast by many; two-day conference October 11-12 in Tokyo sponsored by U.S. **Television Digest** publication will include tour of early-operating JCTV and Asahi Broadcasting (call 202/872-9200 for information). CNN is currently carried, live, in Tokyo hotels and apartments.



INDUSTRY AT LARGE

CORRESPONDENCE, NOTES, REBUTTALS AND CHARGES . . .

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A NEW Challenge?

I keep thinking we have received every possible report of field problems with our equipment, that there is no creativity left in the dealer world. And then somebody comes along to brighten up our day. Try out the enclosed report from a TVRO dealer in Grant, Nebraska;

Customer Complaint:

'He says a raccoon got a hold of the downconverter and ate part of it. He needs an exchange and claims it is beyond repair . . .'

David R. McClaskey

Intersat

1000 Lake St. Louis Blvd.

Lake St. Louis, Mo. 63367

The solution is obvious to us; all downconverters (and other outdoor equipment) should be sprayed with a scent which raccoons find distasteful. There is an entire new business opportunity here for someone; spray cans filled with various scents to allow dealers to select the scent which corresponds to varmints in their area! We always knew this industry was a zoo.

GOOD BYE Quotrader?

Your April '84 issue update on Teletext services mentioned Quotrader. I am sorry to have to advise that they have pulled the plug and are no more. I was their west coast rep and installer. They indeed had a good product but they never spent a dime developing interfaces or upgrading for additional computer lines. I hope somebody else picks up the ball and would be interested in hearing from others who have similar aspirations.

Ed Castiglioni

EARTHcom

4 G Street

San Rafael, California 94901

(415/454-1243)

A shame. It costs big bucks to break into the data field and stay there. Innovations and changes are so rapid that firms with light funding are almost sure to be buried by tomorrow's technology.

GALAXY ONE Check

I read in CSD that you were looking for signal reports for the Galaxy 1 service. I checked the levels at around 8 AM using our Scientific Atlanta 10 meter steerable Az-El dish with a standard feed, 120 degree LNA, through 80 feet of 1.2" Heliax® into a four port divider and then to an S/A 6600 dc receiver. Video output from the 6600 is direct to a switcher which feeds a monitor as we do not have this particular receiver connected through our video DAs. Audio terminates into a patch panel for monitoring.

You will notice I found no significant difference between the even/odd readings. Galavision was the only service normally up, not up, when these readings were taken. Video quality was acceptable on all transponders except for WOR which appeared to have a bad tape running at the time; and the HBO bars on transponder 1 which seemed to have a video DA cranked down as the video peaked at only 67 IRE units and the sync was only 33. I have noticed that they run these bars

at a reduced level quite frequently.

Transponder	Service	C/N	Other
1	HBO bars	21.3	68 IRE Units/33 IRE sync
2	TNN	22.8	
3	HBO LinkAbit	21.0	
4	Disney/East	23.0	
5	Vacant		
6	SIN	24.0	
7	CNN	24.0	
8	CNN-2	24.2	
9	Vacant		
10	Vacant		
11	CBN	22.9	
12	Home Team Sports	22.0	
13	C-SPAN	24.4	
14	TMC/West	22.8	
15	WOR	23.0	
16	Vacant		
17	HBO Bars	23.8	100 IRE units/40 IRE sync
18	Vacant		
19	Cinemax	24.0	
20	Vacant		
21	Vacant		
22	Vacant		
23	HBO/East	24.1	
24	Disney/West	23.6	

Having a 10 meter dish certainly does good things for your carrier to noise ratios (!). Now some notes on our TNN operation. While we were up exclusively on Westar 5, transponder 9D, we had an awful crosspole problem if the people at Group W were to be believed. Since we moved to G1, we have not had to reset our crosspole but one time and that was right after we went up. We also determined that a lot of our problems could be traced to Group W station operators who could not read crosspole correctly. And, we also discovered that the Westar 5 bird has some orthonagality problems as well.

We also experienced what I suspect may have been the first true case of close-spacing interference; F3R to G1. When we looked at G1, TR2 (our transponder) just before going up, we noticed a couple of SCPC carriers right in the middle of our transponder. They were not supposed to be there, of course. Our suspicions were right . . . it turned out to be Satellite Music Network's 'Rock America' service which is uplinked out of Dallas. A phone call determined they were uplinking into F3R's TR3, as SCPC, using a Scientific-Atlanta 4.6 meter dish. They were running higher than normal power and the Wegener engineers had been pulling their hair out trying to determine where the extra power was actually going (they could measure their downlink signal on F3R, TR3, and see it was not going there!). They knew the SA 4.6 meter antenna has a sidelobe problem but they didn't know the sidelobe was so severe that the extra power was squirting off into TR2 on G1 and causing them to come back down on that transponder as well. They finally put in a 5 meter SA antenna to reduce the sidelobe interference to a level around 3 dB out of the G1 (TR2) noise



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CORRESPONDENCE/ continued from page 63

floor. This of course helped us clean up our TNN signal as well; when you had the TNN signal on G1, TR2, and you were operating with a C/N in the 11 to 13 dB region, those extra carriers in there caused a more pattern in our reds. No amount of receiver fiddling would take it out. Ironically, the interference was aggravated by the extra hot 6 GHz LNAs on board G1. The G1 receiver catching our 6 GHz uplink signal is sufficiently hotter than W5 that we were able to drop our output power more than 5 dB by moving from W5 to G1.

Those coming to the Nashville show will be welcome (after calling first!) to drop by the TNN uplink site; y'all bring your cameras!

John U. Almon
Earth Station Operator
The Nashville Network
2806 Opryland Drive
Nashville, Tn. 37214

Undoubtedly, someplace (such as Nashville), **the G1 signals on vertical** (even numbered transponders) **and horizontal** (odd numbered transponders) **are equal or more or less equal in strength. HBO tests done on Long Island also find them about equal. But we can verify that down in the Caribbean, and west in Hawaii and even Johnston Island, the odds are up by as much as 3 dB over the verticals. What about the coast of California and the northwest? How do you fellows find the odd/even battle on G1 shaping up?**

CANDIDATE Recommendations

While I had the opportunity to 'input' to the Friends Of SPACE platform while it was evolving, I wanted to take this time to focus on a few minor changes in the way SPACE conducts itself which I believe are essential to the creation of a better, 'more trusted,' SPACE.

- 1) I would urge that all of the financial records of the trade association be audited on a semi-annual basis by a certified public accounting firm which would then report the results to the SPACE board **and** the full membership of the association. I further believe that all parties handling SPACE funds should be bonded for their work.
- 2) The future of this industry depends upon the network of strong and reputable dealers. All of SPACE's activities should focus on making dealers as strong as possible.
- 3) I further believe that in all future elections, the balloting process should be handled by an independent, outside, accounting firm who would then advise the full board of the results.

Thomas P. Harrington
Universal Electronics, Inc.
4555 Groves Road, Suite 3
Columbus, Ohio 43232

Harrington is one of the six dealer candidates selected by the Friends of SPACE group (see CSD/2 for July 15th).

HAVOC Coming?

I note that Coop and a group plan to visit the Orient this coming fall. I have written to Rick Schneringer suggesting that he consider a trade show for a fall date in Hong Kong or perhaps Sydney. My suggestion is based upon the growing number of manufacturers now in Taiwan (most of whom will begin to make their presence felt **late** in 1984) and the many TVROs now being installed in this region of the world. We have been involved in the 'TVRO movement' from the very beginning (well, the Miami SPTS show in February of 1980 anyhow) and each month I pay routine visits to our agents spread throughout this region of the world. We now have demonstration antenna systems at each of the Australian Embassies as well as at our own facility in Sydney and Hong Kong. Anyone from the American TVRO industry is welcome to stop and 'use' these facilities while visiting.

I now know of 8 TVRO equipment manufacturers in Taiwan and one of these is gearing up to produce 1,000 antennas plus electronics per week; he will be using a block downconversion type of receiving system. Many of the firms in Taiwan now gearing up for the marketplace are substantial and their appearance in the market could wreak havoc with North American suppliers. Finally, in addition to the forthcoming Aussat 12 GHz system to be launched in 1985, we have China

also planning their own system and Thailand interested in a domestic system. Things are getting interesting in the Pacific!

Fraser C. Hickox
Interscope Pty Limited
2/5-7 Ethell Road
Kirrawee, NSW 2232
Australia

Fraser is his usual modest self. His firm has been 'the pioneer' for private TVRO systems throughout virtually all of the South Pacific, opening up both home and semi-commercial (i.e. hotel, apartment) markets which others have been unable to crack. Fraser started off by developing a friendship with Taylor Howard and Howard responded by creating a special receiver design for the original Australian 'outback' TVRO systems. The first receivers were built for Australia by ICM/International Crystal Manufacturing in Oklahoma City and since that time Fraser and his 'lads' have developed the kind of TVRO world in the Pacific which many aspire to here in North America.

A trade show in Taiwan or Hong Kong? We paraphrase a line we heard Dave McClaskey mutter one day recently; "Will the last American manufacturer to leave the industry please bring the flag with them?"

ROLL Our Own?

I am sure somebody has asked this, but I have yet to see it in print in any TVRO publication. Why hasn't some BIG corporation or the manufacturers of TVRO equipment banded together to lease a satellite transponder and put our own premium-type of channel up there?

The constant 'threat' of scrambling and the legal questions constantly pursued by premium programmers and cable firms are the biggest worry on the minds of consumers. **If these questions could be removed**, the TVRO industry would skyrocket overnight into the multi-billion dollar class.

I, like most people, do not and would not object to paying a reasonable fee to receive satellite programming. But, if it is left to the premium service programmers presently serving the cable firms, we'll either not be provided with a service, or we'll have to place our TVROs in hock to make the payments.

TVRO systems, if unquestionably legal and if able to receive their own dedicated premium programming, could and would change the face of American entertainment. Our local cable service, Cablevision of Memphis, is not looked upon favorably by most of its subscribers. If the subscribers had another choice, at a reasonable price, they would jump at the opportunity.

Murphy L. Farley
America Satellite
4624 Billy Maher Road
Memphis, Tn. 38138

The concept of a TVRO industry premium service channel was first mentioned in 1979. And 1980. And 1981. And 1982. And 1983. You have just kept it going for another year. Each year we discuss it, some spoil sport throws cold water on the concept by pointing out that there are 'not enough of us, yet' to make it economically feasible. But that will change in time and we have always favored an industry operated premium service channel. The bucks align somewhere like this:

- 1) It takes around **\$150,000 a month** these days to rent a transponder full-time;
- 2) It takes around **\$35,000 a month** to amortize or rent an uplink service to feed that transponder;
- 3) It takes around **\$20,000 per month** in tape playback costs to keep the system fed with the **mechanics** of programming;
- 4) It takes around **\$5.00 per month per home** to pay the costs of renting the same type of movies which HBO and Showtime peddle, provided you are at least in the **100,000 home** (\$500,000 per month) league;
- 5) Somebody has to operate this and within reasonable bounds, that will cost you at least **\$1.00 per home** per month.

Roll all of those numbers together, don't give anyone an American Express Card, and uplink from Nogales where labor rates and electricity costs are low and you have a start-up cost of around \$805,000 per month for 100,000 terminals. That says

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(505) 345-4584

NEW YORK

SATELLITE VIDEO SERVICES
R.D. 1, Box 85-S
Catskill, NY 12414
(518) 678-9581

NORTH CAROLINA

STAR TECH OF
NORTH CAROLINA
1402 Mechanical Blvd.
Garner, NC 27529
(919) 779-0273

OHIO

SATCO USA
835 Cookson Ave.
New Philadelphia, OH 44663
(800) 362-8619
(800) 362-6781 in OH

OKLAHOMA

CIMARRON DISTRIBUTING
Rt. 2, Box 55
Selman, OK 73834
(405) 727-4259

DULANEY'S
100 Northwest 44th
Oklahoma City, OK 73118
(405) 528-7098
(800) 522-8176 in OK

OREGON

SRC INDUSTRIES
773 S. Oregon St.
Ontario, OR 97914
(503) 889-7261

SRC INDUSTRIES
OF PORTLAND
Building B. Unit 17
9425 S.W. Commerce Circle
Wilsonville, OR 97070
(503) 682-2467

PENNSYLVANIA

D H SATELLITE
242 South Silver
P.O. Box 832
Mount Pleasant, PA 15666
(412) 547-6160

LINDSAY AMERICA
477 E. Willow St.
Williamsport, PA 17701
(717) 326-7133 in PA
(800) 233-2303

SATELLITE VIDEO SERVICES
OF PA
317 E. Pleasant Valley Blvd.
Altoona, PA 16602
(814) 942-5003
(800) 242-3860 in PA

TENNESSEE

LEWIS ELECTRONICS
West Elm St.
Humbolt, TN 38343
(901) 784-2191

TEXAS

VIA CABLE
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214 Junction Hwy.
Ingram, TX 78025
(512) 367-5714

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STAR TECH., INC.
29 Hammit Lane
Salem, VA 24153
(703) 387-0062
(800) 221-4656

TELSAT EAST
1515 Shenandoah Ave.
Front Royal, VA 22630
(703) 636-1777

VESS DISTRIBUTING
625 Lower St.
Buchanan, VA 24066
(800) 368-1314
(800) 572-3161 in VA

WISCONSIN

DH SATELLITE
600 North Marquette Rd.
Prairie du Chien, WI 53821
(608) 326-6705
(608) 326-8406

CANADA

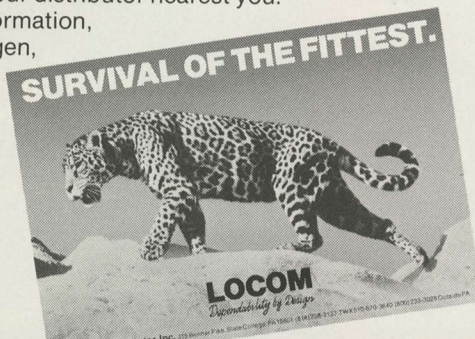
CANADIAN MICROTECH
SALES
Box 381
Ingersoll, Ontario
Canada N5C 3V3
(519) 485-3201

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Lindsay, Ontario
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(705) 324-2196

PULSAR
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Saskatoon, Saskatchewan
Canada S7K 5Z2
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Contact your distributor or send this coupon for a full color jumbo poster of the LOCOM® *Survival of the Fittest*, suitable for your showroom wall.

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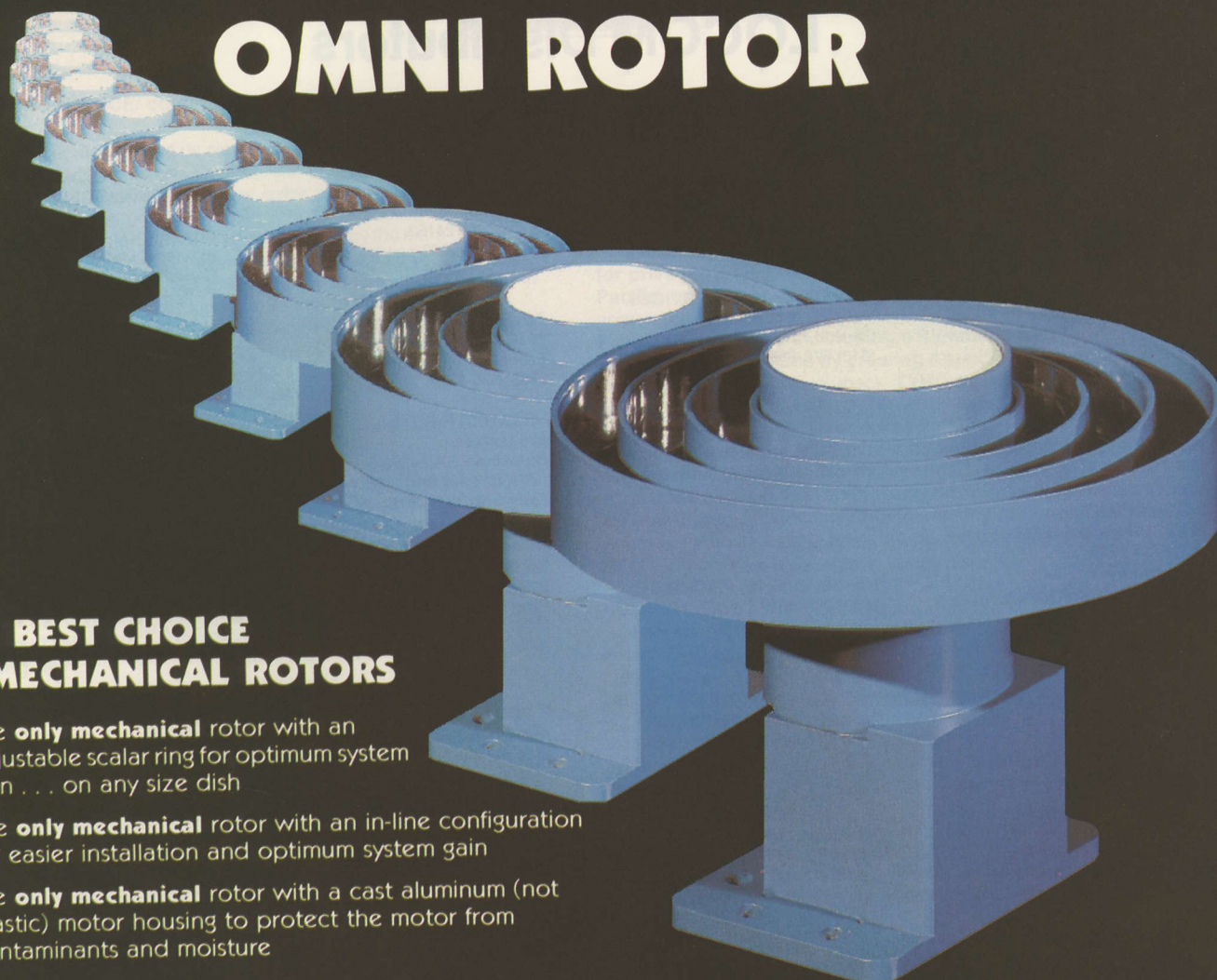
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CSD

NEW FROM M/A-COM OMNI ROTOR



THE BEST CHOICE IN MECHANICAL ROTORS

- The **only mechanical** rotor with an adjustable scalar ring for optimum system gain . . . on any size dish
- The **only mechanical** rotor with an in-line configuration for easier installation and optimum system gain
- the **only mechanical** rotor with a cast aluminum (not plastic) motor housing to protect the motor from contaminants and moisture

The Omni Rotor also features:

- All aluminum scalar and housing for mechanical rigidity
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- Virtually zero insertion loss

Until today, installers who favored rotor-controlled feeds had only one choice. Trouble was, there was plenty of room for improvement. Now, here's the better alternative: M/A-COM's Omni Rotor.

Omni Rotor is the only mechanical rotor with an adjustable scalar ring, for optimum system gain. The only rotor with an all cast motor housing, to protect your motor from freezeup, contaminants and moisture. And it's the only mechanical rotor designed in-line, to make installation fast, easy and accurate.

Best of all, Omni Rotor is manufactured by M/A-COM Omni Spectra, the most respected name in the



Home TVRO industry. Other M/A-COM state-of-the-art Home TVRO products include the Omni Polarizer (with solid state control), 8' and 10' Prodelin reflectors, polar mount, receiver, LNA, LNB and cable accessories.

Take a look at the features of the Omni Rotor, and its price, and you'll agree: There's only one choice in mechanical rotors: Omni Rotor.

Check the adjoining strip for the authorized M/A-COM distributor in your area. Or contact:

M/A-COM Omni Spectra, Inc.
21 Continental Blvd., Box C
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(603) 424-4111



M/A-COM OMNI SPECTRA, INC.



TVRO Products Distributors

ARIZONA

High Frontier Distribution
800-382-0395
602-966-9824

COLORADO

Echosphere Corp.
303-761-4782

GEORGIA

Quarles Satellite TV
912-632-8723

IDAHO

Recreational Sports & Imports, Inc.
208-523-5721

INDIANA

Consumer Satellite Systems
317-845-4400

MISSISSIPPI

National Microtech
800-647-6144
601-226-8432

MONTANA

Avitel
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406-761-3283

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Satellite Video Services of NH
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NEW YORK

Satellite Video Services, Inc.
518-678-9581

OHIO

Satellite Sales, Inc.
216-461-0000

OREGON

Wespercom
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SOUTH CAROLINA

Satellite Television Systems
803-261-8209

SOUTH DAKOTA

Warren Supply
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TENNESSEE

National Micro-Dynamics
615-892-3901

TEXAS

Star Com Distributing
915-263-7512

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Startech, Inc.
703-387-0062

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Satellite Receivers, Ltd.
414-432-5777

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ALBERTA

Millman's Comm. Services Ltd.
403-451-3127

BRITISH COLUMBIA

Channel One Video Corp., Ltd.
604-734-4966

ONTARIO

Nedco
416-677-1410

SASKATCHEWAN

C.A.L.E. Communications, Inc.
306-949-9181



Omni
Spectra

M/A-COM OMNI SPECTRA, INC.

break even is around \$9.00 per home per month or so. Do we have 100,000 homes out there willing to pay that much for a 24 hour movie channel? Well, let's see. As long as HBO/Showtime/The Movie Channel (et al) are not scrambled, no-way. But when they do scramble, then we have an exciting marketing opportunity for somebody with perhaps a year's worth of losses tucked away in a bank account to seriously consider. Maybe 1985 would be a better time to bring this up; again.

I'M CHARLIE Brown

I thought you might like to have this photograph of Coop meeting 1983 Dealer of The Year Charlie Brown (Lefler and Brown TV, Knoxville, Il.) at the Niagara Falls STTI show. I'm not sure what Charlie said that broke Coop up!

George Jones
Burlington, Iowa 52601



We remember. Charlie said, "It's good to meet another legend." We found Brown to be an extraordinary dealer and salute those who were involved in selecting him as Dealer of the Year. Brown happens to handle the Conifer (12 foot) TVRO system line and naturally that made him especially close to George Jones and Conifer. Brown is running for the Board of Directors of SPACE, as a dealer of course, and we commend those who were involved in the selection process. If we had five more guys like (Charlie) Brown on the SPACE board, the dealers could rest a lot easier at night. Oh yes, after Charlie's comment about being a legend, Coop responded, "It's good to meet somebody named Brown who is not an attorney!"

BLACK Is Beautiful?

I have learned, through a 'reliable source,' that painting a mesh antenna a dark color, especially black, raises its reflective noise temperature. I have always wondered about this since I know dark colors are not recommended for our solid dishes. Is there any truth to this in reference to mesh or expanded metal antennas?

Rick Cooper
Satcon
141 Boston Post Road
Old Saybrook, Ct. 06475

Janeil had better hope not.

INVESTMENT Opportunities

I am a retired dentist who became excited about satellite communications in 1980. I have also been a radio, television and short-

wave 'bug' since the 1930's and have followed the changes in communication systems with great interest. I spoke with Coop several years ago at the Atlanta industry meeting about investing in the TVRO industry and he gave me some excellent advice. Consequently I acquired stock in Avantek, Comm Tech Data, RCA, ITT, ATT, United Telecomm and National Telecomm. I also helped fund a dealer in my state so I now have a keen interest in the problems of being a dealer in this field. I continue to look for promising investment opportunities in this field and would like to suggest a regular 'financial column' in CSD. If you were to profile those firms that have been financially successful, pointing out **why** they have achieved success, I believe this would help spark additional investors in this field. I really enjoy the Digest and look forward to receiving it every month. Coop knows his electronics and he writes with a humor that is appreciated. He also has a serious side and because he does not hesitate to pull punches when something needs to be straightened out, the industry has continued to mature.

Dr. Leslie F. Jones
410 S. 1st Street
Marion, Ill. 62959

The majority of the really successful firms (as measured by their investor returns) **are privately held in our industry. If you were to list those firms as a 'top ten' all would be held either totally by their founders or at most by a handful of early investors. Several of those have been on business plans to take them public over the next 6 to 18 months, however, and perhaps there will be a correct 'time' to routinely report on such activities.**

NOT Cross Poled

I was bothered by the statement in Transponder Watch for July 1st CSD which stated that SPACENET and Westar V are cross polarized to one another on equivalent transponders. I find that not to be the case. The first two active transponders (01/BTN and 11/HSN) are horizontal and appear to be on the same frequency and polarization as the corresponding transponders on Westar V. While I have your attention, we recently noticed what appears to be a power decrease on many of the Galaxy 1 transponders; for example, 15, 19, 23 and 14 and 20. Is there a technical problem here?

Kenneth R. Hood
Rt. 3, Box 390C
Neosho, Mo. 64850

A slip of the pole on our part. The now 2.5 degree spaced (Westar V moved a half of a degree on FCC orders) Spacenet 1 and Westar V services are indeed on identical polarizations; in effect Spacenet has the 'Westar format'. Galaxy problems as you describe are not universal (nobody else reports such problems and our own off-satellite checks do not reveal any substantial changes). **This suggests you have something in your area** (such as a new 'TI source') **which is getting into your antenna at the relatively low G1 look angles. If all of the other birds and transponders seem 'normal' to you, the problem is probably not the system itself but rather a local source of interference. If F1R signals (beyond G1) and F3R signals are normal, your dish has not lost 'tracking'. If transponders in the same dial-range (14 through 23) are normal on F1R and F3R, either side of Galaxy, your system is not the cause of this. That leaves only TI (terrestrial interference).**

SUNRISE Fade Out?

We have a Conifer 12 foot antenna with a M/A-COM 100 degree LNA. The system works perfectly and is kept on F3R, primarily on transponder 3, for the Zephyr Weather Service. At sunrise, every morning, for several minutes the signals fade out. After a few minutes, they come back. How come?

John Dorosk
Connecticut Satellite
65 Benson Road
Ridgefield, Ct. 06877

Good question. First eliminate any possibility that the problem is Zephyr based; check to see that other transponders on F3R are normal (in which case it is Zephyr or something related to the add-on equipment for Zephyr). **If they are all disappearing at the same time, the problem is system related. Now, why would the**

system fail routinely at sunrise? We can reject outside sources (the sun, wind, rain and moon) as unlikely at best. This suggests something related to the 'environment' of the system itself. If you find all transponders on F3R gone at the same time, notice the signal level meter on the Conifer receiver. Does it read a normal (low signal level) reading such as you should have when no satellite signals are being received? If it does, someplace between the input to the LNA and the output of the receiver you have an internal problem. If the meter reads high, as you would expect with a signal present and tuned in, but there is no reception, this suggests a local source of interference is 'covering up' the F3R reception. That it is coincidental with sunrise could be a clue; something nearby is turning on, briefly, at sunrise (whether on command or time clock) for a few minutes time causing interference to the TVRO system.

REALLY North!

I have just read the question 'Who holds the record for the most northerly TVRO installation' (CSD June 01, 1984; page 92). For your information Telesat Canada has operated a TVRO for the Department of National Defense at Eureka, on Ellesmere Island, since 1982. This installation receives service from ANIK D1 at a location 80°.00', 25" north and 86°, 22' 57" west. We use a 4.5 metre antenna and from all reports the pictures are fine!

J.M. Bryan
Manager
Corporate Communications
TeleSat Canada
333 River Road
Ottawa, Ontario
K1H 8B9

We also received a second report on this installation which is close enough to the North Pole to see Santa's pre-flight checks! Unless we receive a more northerly claim for Clarke belt satellite reception, that's it; the 'furthest north TVRO'!

WILL the Real NSC . . .

This letter is to advise that our company, National Satellite Communications, also known as N.S.C. or National Satellite is in no way affiliated with corporations in Midvale, Utah and Anaheim, California currently going by the name of National Satellite Distribution Centers.

This newly formed corporation, previously going by the name 'Lady J', was acquired by Intercontinental Products Corporation and it's President Harry Warner. Their name has caused significant confusion to both dealers and suppliers of our company.

To date we have received bills we have not incurred from some manufacturers and publishers. I am sure that some of the credit decisions being made could cause those giving credit problems, since they apparently **believe** they are dealing with our company. We are also concerned that if the Utah company does not pay its bills on time it may reflect on our company's ability to expedite the free flow of goods and services which we depend upon.

National Satellite Communications is taking all appropriate steps to immediately protect the good name and reputation we have worked so hard to establish over the past four years. We ask that anyone who is uncertain about which company they are dealing with contact one of our two offices. The only authorized signatures on purchase orders are as follows: Jim DiDonato, Mary Mason, Sally DiDonato, Jack Hanna and Ron Bruse from our New York office, and Kevin Mielcarek, Vernon Hunter from our Florida office.

Ronald F. Bruce
Marketing/Finance
National Satellite Communications
21st Century Park
Clifton Park, N.J. 12065
(518/383-2211)

Sooner or later we were bound to 'run out of' names and word combinations which include the word 'satellite.'

EQUAL Time

I have read with a great deal of concern the letter from Henri Guerin in the CSD issue of June 15, 1984 and am glad to have this

opportunity to respond. There is no question that we at Luxor stand behind our products and have uppermost in our business philosophy that customer satisfaction is the foundation upon which any business is built. It is this prime philosophy that has guided Luxor for more than 60 years in the consumer electronics industry and it is what will guide us now in attempting to reach a solution to the problem Mr. Guerin so graphically describes.

First some background: When the Luxor receiver was introduced in the U.S. in the fall of 1982, it was being delivered by Luxor to STS **simply as a component**. Luxor had **no control** over marketing and distribution. Under our contract, STS, as the exclusive importer and master distributor of the component receiver, had the **sole responsibility** for marketing, distribution and service, **as well as for completing the system** by the specification, selection and supply of the downconverter. Initially this worked well and Luxor became a major factor in the TVRO industry.

Late in 1983, STS chose to manufacture and supply a downconverter **of its own design**, a decision that initiated the present problem and one that was exclusively the decision of STS. When Luxor ended its relationship with STS in February of 1984, we took over the responsibility for distribution of our own products and, as one of our first acts, **Luxor chose another source** for the supply of downconverters — a decision from which Luxor had been previously excluded.

In the termination agreement between Luxor and STS dated 2/21/84, it is clearly stated **"Distributor (STS) agrees to honor the warranty it has issued regarding the STS downconverters sold with the Luxor receiver program."** We are advised that STS is fully prepared to live up to their downconverter responsibilities as stated by Ed Horton, President of STS, in CSD 8/1/84.

The solution: It is absolutely our intention to resolve the problem quickly. Luxor now has in place a series of service depots from coast to coast as well as a technical and service department at the Luxor office in Bellevue, Washington.

It should be noted that it is the policy of Luxor that authorized distributors are initially responsible for the speedy service and repair of Luxor products.

In the case of the STS packages, i.e. Luxor receivers and STS downconverters, we have had absolutely no control over STS repair policies and service. We still have no control over STS. However, we have arranged with our service group to be sure that Luxor products will be quickly and efficiently serviced and we will serve as a clearing house for all STS package problems:

- 1) Dealers with an identified Luxor receiver problem **sold in an STS package** should return the receiver to **this office** for service. The receiver will be evaluated and quickly forwarded for repair and returned to the dealer.
- 2) Dealers with an identified **STS downconverter failure** should return the STS units to STS who have a stated commitment to efficient repair or replacement. My office should be advised by any dealer who has experience to the contrary.
- 3) Where the dealer **cannot identify the problem** as either receiver or downconverter in an STS package, then both units should be sent to **this office** for evaluation from which they will be forwarded for speedy repair or replacement.

It is important that these simple procedures be followed:

- 1) STS related service problems should be directed to Mr. Chuck Watkins, the customer service manager at 600 108th N.E. #539, Bellevue, Washington, 98004; phone (206) 451-4414 for return authorization.
- 2) The caller will receive an RA number authorizing the return of the product(s) and an estimate of the turnaround time.
- 3) Freight returned from this office to the dealer **will be paid by Luxor**.
- 4) This offer to directly assist in satisfying dealers with STS package problems will remain in force **until the end of the year 1984**.

Please keep in mind, this direct solution to the STS package problem applies **only to STS packages over which we have had no control**. All other Luxor products and Luxor authorized downconver-

ters will continue to be serviced by our nationwide chain of distributors.

This special program is being put in place for only one reason, Luxor has never been and will never be a short-term player. Our history of 60 successful years in consumer electronics is the best evidence. And we will stand by our products.

Even though we are in no way responsible for the degree of STS's problems, we are prepared to help to the utmost of our ability those Luxor owners who have put their faith and their investment in the Luxor brand. We hope these efforts will clearly illustrate our basic business philosophy and will also assure those who have had STS package-related problems that these problems are in the past and that the Luxor group and Luxor products are not only of the highest quality in the industry but that they can be relied upon in the future.

Hans Giner
Luxor (North America) Corporation
Suite 539
600 - 108th Ave., N.E.
Bellevue, Wa. 98004
(206/451-4414)

Our August 01 edition of CSD carried a response on this same issue from STS President Ed Horton. Now dealers, clearly, have a pair of options in getting repair and warranty assistance for STS+Luxor equipment packages. Readers who continue to have problems with the repair cycle are invited to keep CSD advised of such problems; hopefully, a thing of the past!

RTTY On Westar

For receiving the SSB SCPC radioteletype signals, I am using the Universal Electronics M-600A as well as three Fredericks 1202 FDM receivers. These are fed (individually or as a group) by a Collins 651-S1 HF receiver which is of course tuned to the appropriate portion of a TVRO baseband receiver through the video output terminal in the traditional manner. All of the RTTY FDM signals I have printed here run through the 1202F receiver (equipped with 340 hertz shift filters). I tried both the B (120 hertz) and A (170 hertz) models with no results. The Fredericks are available from Webb Linzmayr, Electrovalue Industrial, Inc., P.O. Box 376, Morris Plains, N.J. 07950 (201/267-1117).

I would caution that **CSD** not publish the NCIC channel as this may cause it to become scrambled. Another good frequency which I use daily for test purposes is the Bank of America from Santo Domingo on G2, TR18, channel 2 reverse, lower sideband at 75 words per minute. On Westar 2 TR9, 4.5770 MHz, channel 3, normal mode, lower sideband, 57 words per minute is Western Union traffic from Dallas. At 4.575 channels 3 and 4, lower sideband, normal mode, at 110 words per minute is Western Union mailgram traffic.

Arthur J. Levy
Apogee Communications Group
382 Alpine Way
Boulder, Colorado 80302

Levy is well into 'radio teletype' via satellite and those already 'there' will appreciate the data. The SCPC column returns next month after a two-month absence. We'll be looking at RTTY via satellite this fall. It is complicated, and confusing, but very rewarding. Now why would a BOA branch in the Dominican Republic be up on Galaxy 2? Tune in the fall and see!

FACTUAL What?

In Coop's Satellite Comment for May 1984 he talks about 'factual advertising.' This sort of dealer advertising certainly does not do our industry any good. And it is good to air some of these 'excesses' in the business so others will not make the same mistakes.

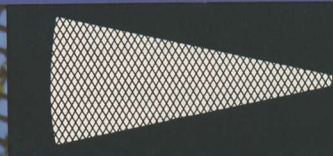
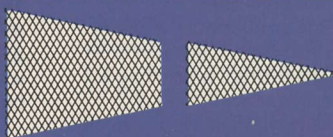
However, it might be a good idea to examine the advertising in **CSD** for the same month, page 87 for example. Here we have an advertisement claiming a 73% efficient antenna, with no mention of the type of feed being used, or any reference to how the testing was done. If you are taking this sort of advertisement in **CSD**, what is to stop another manufacturer from claiming his antenna has 80% or 90% or even 100% efficiency? Several telephone calls to the company in



Speaks Openly!

Our story has holes in it. Many holes. Holes by design. Expanded and perforated metal to give satellite dishes great advantages over solid dishes!

- Approximately 70% reduction in wind load, for increased stability with less strain on antenna and supporting structures.
- Lighter weight than solid metal or fiberglass. Reduced weight means lighter support structure.
- "See-Thru" Pattern blends into the landscape.
- Better Solar Heat Diffusion decreases amplifier noise.
- Specially Engineered Metalex Expanded and Perforated Metal maximizes antenna gain.



Metalex Corporation
World's Largest
Producer of Custom
Petals in Expanded
and Perforated Alumi-
num and Steel for High
Performance Satellite
Dishes.



PIONEER MEMBER OF
SPACE

Box 399, 1530 Artaius Parkway, Libertyville, IL 60048 (Chicago suburb).

Manufacturers Inquiries Welcome
CALL TOLL-FREE
1-800-323-0792
(In Illinois: 1-312-362-8300)

Want to sell SMATV systems? Let a General Instrument team help you.



For successful SMATV installations you need the latest "state of the art" full featured systems and that's what we offer you at General Instrument. But equally important to your success are General Instrument designers and systems engineers.



Their full-time job is to help you make SMATV sales and installations in hotels, motels, apartments, condos and elsewhere.

They are ready to offer their technical knowledge and experience to help you penetrate the growing SMATV market.

As a General Instrument customer with a prospective SMATV installation, here's what our teams will do for you:

1. Specify every component you'll need—from dishes to head-ends to amplifiers and wall jacks.
2. Lay out the entire system and give you a set of blueprints for your prospect.
3. Price everything required.
4. Provide comprehensive system installation instructions and answer any questions you may have.

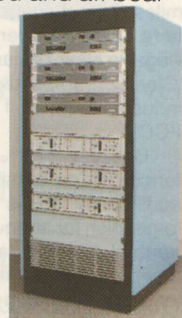
And all this at no additional cost to you.

Highest quality hardware, too.

We have a complete line of compatible, full-featured components. Everything you'll need and all bearing the respected brand name your prospects already recognize:

General Instrument.

Write us today to find out how we can help you cash in on the profitable SMATV market.



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GENERAL INSTRUMENT CORPORATION
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Tucson, Arizona 85714
602/294-1600
or
65 Waverly Street
Delhi, Ontario
Canada N4B 1E8
519/582-0710

GENERAL INSTRUMENT

CORRESPONDENCE/ continued from page 71

question have not been returned. All I wanted to know was **how** the tests were conducted. The 'DH' stands for Design Homes and this company has been producing a low-cost pre-fabricated home. Unfortunately, they do not seem to have anyone around who can answer a simple technical question.

Jack Jung
Farview Satellite
Edgar, Wisconsin 54426

The DH advertisements do mention their claim for 73% efficiency. We questioned them about that many months ago and they provided us with some reference data that looked legitimate to us. However, we have never tested their antenna and must trust the tests conducted by others who claim they have. A seventy-three percent efficient antenna is not impossible (the 4.5 foot Quadralite was tested at 80% efficiency much to the amazement of many, including Taylor Howard) so it is possible. Maybe the trick is to keep making smaller and smaller antennas to get better and better efficiency.

FLYING Circus Plans

I read in CSD that there is some chance that the next edition of "Coop's Flying Circus" might visit Australia and New Zealand next fall. Don't expect too much!

The industry is still very much in its infancy in this part of the world. Australia and New Zealand have but two watchable transponders, on INTELSAT IV-A, broadcasting the same Australian Government sponsored non-commercial program to either side of the country. This is part of the Australian policy to provide television to remote areas of Australia. New Zealand, and Papua New Guinea are in the 'spill over' of the beam. For this reason consumer acceptance of a (US) \$3,700 TVRO system to watch only one channel has been low.

As one of only two manufacturers distributors operating in Australia, our reasonably accurate assessment would be that no more than 200 non-government earth terminals have been installed during the last three years. As far as we can determine, there are only two firms selling TVROs in New Zealand where, until quite recently, it was illegal to even own an earth station. Government opposition to commercial broadcasting from satellite has been very strong in both countries.

In any case, the signal strength levels from Intelsat are typically 29 dBw so the average antenna size is between five and seven metres in diameter which makes for expensive installations.

Our company has remained viable because we have been able to concentrate on selling communities with NO TV, where we do a total installation of an earth station, and a UHF transmitter capable of rebroadcasting the satellite signal over a radius of perhaps five to ten miles using 5 watts RF output. Rebroadcast on VHF is not allowed here and as I understand the regulations, rebroadcast in any form is illegal in New Zealand. Every TVRO system has to be registered as a 'Class Z' earth station, with INTELSAT. Imagine where the American industry might be if every U.S. terminal had to be registered with the FCC!

Because 99.9% of the television sets in Australia are in the PAL format, it is not feasible to offer reception of the AFRTS feeds in NTSC; additionally, this is a very weak global beam pattern requiring a far larger dish for adequate consumer viewing. So it is only in the extreme north of Australia (and Papua New Guinea — Editor) where there is any choice at all, from the Indonesian Palapa satellite(s). We have installed a system for the Indonesian Consulate in Darwin which allows them to watch the TVRI Jakarta telecasts nightly, with sparklie-free reception. As a side note, it was totally illegal to own a 'private' TVRO in Indonesia until very recently and a copy of the current policy is attached for your review.

Regarding the 'future' of TVRO here . . . bear in mind that although Australia is roughly the same size as the USA, the population is only 16 million. Half of this population is contained in five major cities and the people there couldn't care less about having satellite television as they already have a 'choice' from four major TV stations each and numerous AM and FM services. So 8 million people compared to the size of the market within the USA does not constitute much of a market here.

David Keirnan
General Manager
Homesat TV Pty. Ltd.
P.O. Box 37844
Winnellie, N.T. 5789
Australia

The analysis is appreciated. If (and that is a large IF) there is much of an opportunity for a 4 GHz 'homesat' business in the Pacific region, it will largely depend upon the development of programming via Palapa. With present plans for our fall tour group to stop off in Jakarta, perhaps we'll have a better understanding of that potential later this fall.

SQUARING-Off

I have noticed some controversy generating around square vs round dishes. 'If you feed the full square, you get noise around the edges.' There is truth in this, as you showed with the cookie cutter analogy. Let me discuss 3 things that pertain to this argument: 1) The noise theory is academic, 2) There is a 'Square Advantage,' 3) The whole argument is about the wrong thing.

Why is the square noise theory academic? In our footprint area I have yet to see an 8' round dish that will give sparklie free pictures on weaker transponders, even using hot LNAs and low threshold receivers. Spicer's 8' square is sparklie free on all I have set (almost 50 units). Before another dish cut us off, it showed sparklie free on Intelsat at the Las Vegas show. If it's a high noise dish, we certainly would have had sparklies at that low look angle. The gain must be overriding the noise, therefore the noise theory is academic. In my area, the only dishes giving comparable pictures are 10' round or larger. This is consistent with real-world facts; the Spicer tested at 39.6 dB gain on the McDonnell-Douglas range — equal to a 55% efficient 10' round. Why is this? The answer comes under #3.

Meanwhile, what is the 'Square Advantage'? There's lots of them. It's a one man set-up because it doesn't roll. It can be hauled as a legal 8' wide load, and yet gives 10' performance. It can be hauled flat on portables or for deliveries just like the smaller ones. This almost eliminates sidewind problems — a big factor in Kansas where we get white caps on our potties! It is over 11' across the tips. There is something about this fact that gives the dish exceptional beamwidth characteristics — 1.78° at 3 dB down on the range test results. Again, we're back to 10' round performance. It has windload less than a 9' round, and again 10' round performance. I've sold a lot of wives because houses have square lines — why shouldn't dishes? It has 64 sq. ft. of surface area. You have to be at least 9' round (63.8 sq. ft.) to get that area, and you are back to two man set-ups, hauling vertically or illegally, and you still can't get a 1.78° beamwidth out of a 9' round.

Why are we arguing about the wrong thing? There are several things here. For one, I think there is an historically based prejudice against fiberglass, particularly when they are square. When TVRO first started, no one had developed techniques like hydro-forming, compression-molding, roll-forming, etc. Most builders had to use fiberglass, but alas — this required accuracy not needed in boats. The ones who couldn't build a mold just copied someone else's dish by pulling a mold from their dish. That magnified inaccuracies. The result — some bad product. The long term result — prejudice — justifiable at the time, but not any more because the fiberglass boys have learned.

Now let's get to the main reason why over-the-edge-noise is the wrong argument to explain sparklies. Since I bought the Microtech distributorship from Bud Ross when Bird View was an idea, I have sold a lot of fiberglass dishes. Most of them were 9' square or 10' round. I often wondered why I could set 10 identical systems, have good clean pictures on 4 of them but sparklies on the rest. I blamed it on receivers, LNAs, connectors, TI, etc. In short, my repeatability was running around 40%. I finally figured out a way to test the surface accuracy on dishes, and it really opened my eyes. Surface accuracy is the real key to why a dish works good. Take a really accurate small dish, find a clean transponder, and tape a metal pie plate near the center. Bango — you have sparklies. The feed not only loses good RF from that spot, but it also is being fed noise from a point in space where there is no RF

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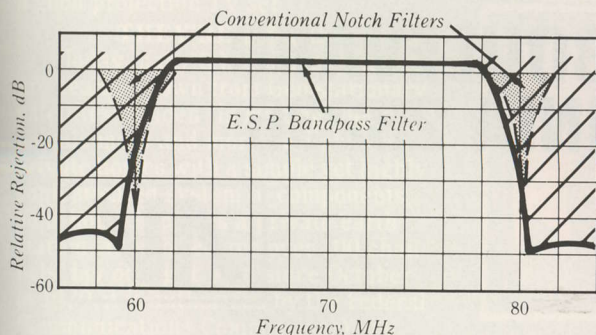
We're so convinced this is the best filter advancement ever, that we'll return your money if you're not completely satisfied.

The TVRO filter from Earth Station Products. Call Gary Friesz at 606-371-3883 to place your order or for more information.

Don't delay. Once you try this TVRO filter you'll wonder where it's been all along.

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Welcome to a range of television programming you've never experienced before—signals from the satellites, captured with perfect clarity by Uniden®, a recognized leader in electronic communication. And all for a low initial investment, about the same cost as a good projection TV set.

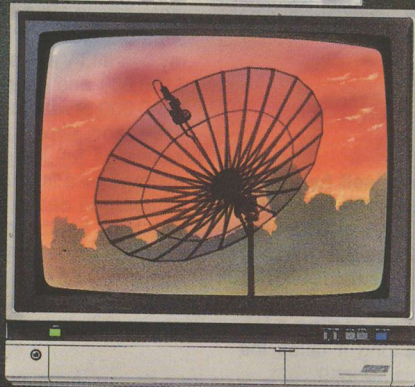
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So prepare to receive visitors from space. See your nearest Uniden® Dealer. And get ready for an outer space invasion like you've never seen before.

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SATELLITE TECHNOLOGY

CORRESPONDENCE/ continued from page 74

— only noise. Why does a Quadralite get a picture? Surface accuracy; it is the most accurate surface I have ever tested. Why does the Egg even get a picture? Surface accuracy. I once saw a Quadralite outperform an 8' mesh. The mesh tested very inaccurate. Let's talk about the right thing — surface accuracy is the secret to **any good dish**.

Jim Nease
STV Co.
516 W. 33rd.
Hays, Ks. 67601

Uncle! **OK Jim, we have probably about worked the Spicer dish to death** (it all started in CSD/2 for April 15th). **You said everything we have said before, but you said it better than we because you live it every day and we just catch up at shows. Hey, we had forgotten about Bud Ross and Microtech. Now THAT is a story!**

CLOSING Garage Doors

I am responding to numerous dealers' letters beginning on page 70 in the July, 1984, issue. These dealers' letters detail a problem we have successfully dealt with in many parts of California. We agree that something must be done about distributor advertising in consumer oriented publications. We have organized ourselves into an association of showroom satellite dealers in order to solve two of the more perplexing problems. Our organization is called **URSSA** (United Retail Satellite Systems Associates, Inc.) which was initially formed to combat 'legions of garage dealers.' We have developed an extremely strong and effective in-store display telling consumers about our organization and what it means to be an URSSA dealer. We have published a twelve page Consumer Guide to satellite TV systems which clearly warns consumers of the dangers in dealing with garage door type temporary dealers. Using a combination of product I.D. stickers, in-store posters, consumer handout literature and other materials, we have effectively defeated garage door dealers playing in our market.

Our next project is a petition drive of our member showroom dealers informing the industry publications such as **Satellite TV Week** magazine, **Channel Guide**, **Orbit**, etc., that **unless** they change their policies in regard to the advertising by such firms as DBS, Long's Electronics, Warren Supply and other supposedly distributor companies which attempt to retail far beyond their service areas, URSSA dealers will no longer give copies of these magazines to their retail customers and that will result in substantial reductions in consumer subscriptions in areas served by URSSA dealers.

In addition, URSSA aggressively performs dealer advocacy services for our members in assuring that manufacturers and distributors honor warranties on a timely basis and serve the interests of the showroom retailer/dealer.

To this end, we have devoted our full time efforts in working to assist URSSA dealers in these important matters. We currently are recruiting members at the rate of 70 to 80% of all showroom dealers in areas our organization is active. We expect to have nationwide coverage by June of 1985. We invite any dealer (showroom dealers only) who is having trouble with the out of their garage types and or is as disturbed by the industry trade public advertising policies as we are to contact us and put our material and clout to work for them, as they have worked for us.

Steven J. Clarke, President
URSSA, Inc.
P.O. Box 1931
Oakdale, Ca. 95361
(209/847-5996)

Fantastic! This is precisely the type of dealer-self help program we have been hoping would come along. Why have you folks been hiding under a bushel basket? If you guys will concentrate on precisely the program you outline, and stay out of trying to hold trade shows, produce television programs, fund lobbying and building statutes, we are with you and behind you 100% of the way. Keep us advised and congratulations on getting a job started that is badly needed (now watch how long it takes the garage-dealer trade-press to start pot-shots at this bunch!).

ONE MORE Chance

This is a letter I wrote to SPACE and its manufacturer's controlled Board of Directors. I started off by telling them that it was coming from a dealer who needs them **ALMOST** as much as they need me (and the thousands like me). Then I said . . .

"Enclosed with this letter, you will find a check dated 7-21-84 for my yearly dues to SPACE. The renewal application has been on my desk since June 5, 1984. When I received the renewal application on June 5th, I confess that there was no intention on my part to renew my membership. After much soul searching, and re-reading, and evaluating information received from SPACE, **Coop's Digest**, and face to face conversations with manufacturers, distributors, and other dealers at various SPACE and STTI trade shows, I will give you and the manufacturers who control you **one more chance** to get this potentially great and much needed trade organization on the course I feel it needs to be on.

"Let me begin by congratulating you on some things you have accomplished that deserve credit. The first is the large amounts of money you, the manufacturers have contributed to SPACE. Nothing could have been accomplished without your money. It was an investment well spent and those of you who continue to produce excellent state of the art products (and some who continue with mediocre products) have received your money back many times over from dealers like myself who purchase and sell to the general public. I know of no manufacturer controlling SPACE who does not have the same business problem I have; trying to provide enough quality satellite equipment to customers to meet their ever growing appetites. This fact in itself, gentlemen, points out our need for each other.

"The second thing deserving congratulations is your decision to stay with Brown and Finn as legal counsel. Without Rick Brown, we would have been off bore-sight long ago. My first opportunity to see Rick Brown in action was at the Omaha SPACE Show. I have never talked with the man personally, but paid particular attention to him during the many meetings conducted at that particular event, and the many political things he has accomplished since. Who else could have pulled off the surprise at the banquet in Las Vegas this past March? I need Rick Brown and the agency of Brown and Finn, **and they need my dealer contribution** to continue this trade organization. Unless my observations of Rick Brown's political genius are in error, he knows it is time to turn loose of SPACE from a managerial position and assume the role of Legal and Political Advisor, which he is so capable of, and has certainly earned.

"The third thing deserving recognition is the selection of Charles Hewitt as (I prefer the title) "General Manager." The search committee made up of David Johnson, Pete Dalton, and Taylor Howard must have had the needs of SPACE foremost in their minds to have selected this caliber of a man for the board to consider. Based upon the interview in **Coop's Digest** dated May 15, 1984, and the accomplishments Mr. Hewitt has instituted during his short time at the "top," (I hope) he is worthy of recognition. Getting SPACE and STTI's Rick Schneringer back together is a worthy accomplishment indeed. I feel sure Mr. Hewitt realizes the value of Mr. Schneringer's contributions to SPACE and the industry in general, and will use his counsel in guiding this organization to where it must go.

"**I will qualify myself as a dealer** by stating that the first satellite equipment sold from my already established TV sales and service store was in 1981. Only at the beginning of 1982 did I begin to keep separate records, for satellite sales prior to then were insignificant to my overall TV sales and service. In 1982, our satellite sales exceeded \$166,000 and during the year 1984 to date satellite sales will near \$500,000 at retail. Based upon **Coop's Digest** survey report of July 1984, and allowing for many part time dealers who qualified themselves as full fledged dealers, I feel that my satellite business is average or a little above when considering that I am a full fledged, established dealer in my marketing area.

"Now for the course I feel SPACE must take to survive and continue to get **my support** as a dealer. First, the manufacturers controlling SPACE must continue to freely give of their money to this organization. I intend to make every effort to know what manufacturers contribute to SPACE financially and to support those companies

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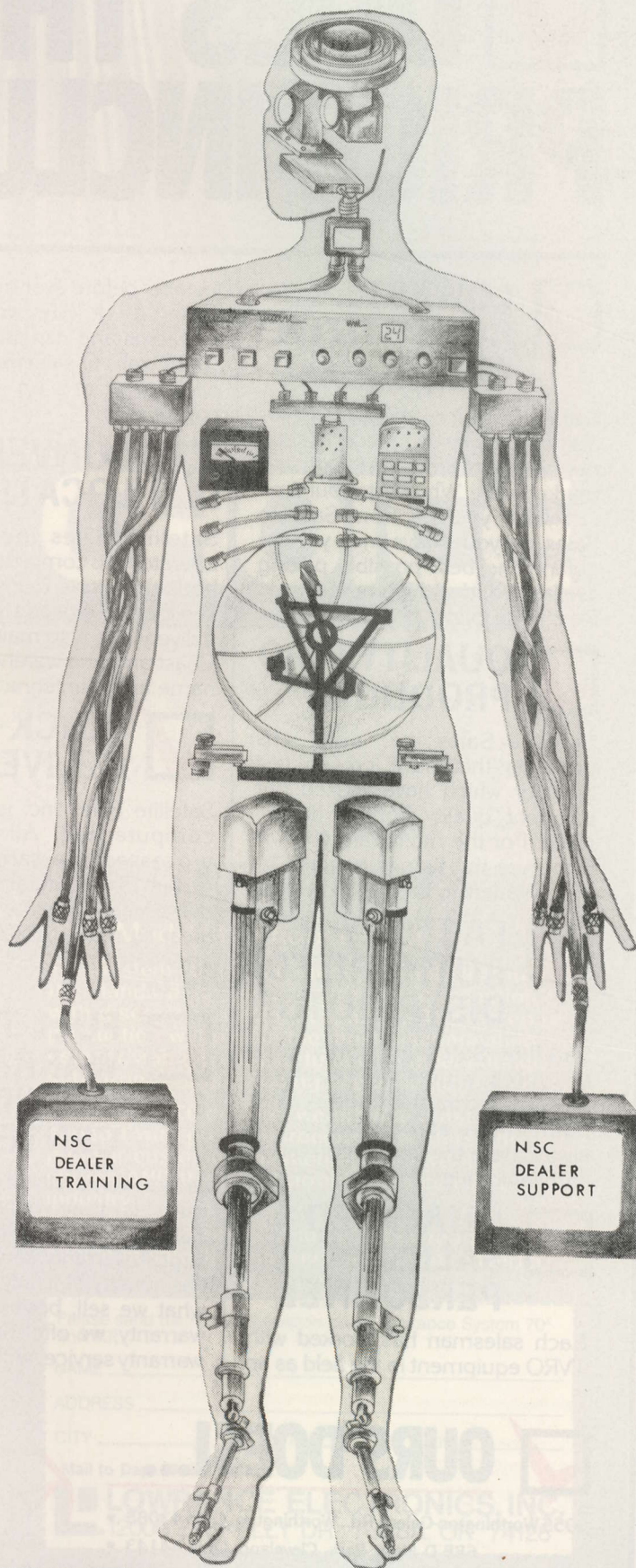
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Satellite Sales Inc. only sells products which we purchase directly from the factory. No middleman add-on's and you always have the latest information and equipment.

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Satellite Sales Inc. presently operates two complete office warehouse locations. Each facility is full service, for speedy pick-up and delivery. We also maintain a West Coast antenna warehouse for our name brand antenna products.

QUICK DELIVERY

Satellite Sales Inc. is completely computerized. All orders are processed the same day they arrive. That means next day delivery service in our main trading area, by regular UPS service and anywhere in the U.S. by UPS next day air.

FULL TIME WARRANTY SERVICE CENTER

Unlike some distributors, where price is their only advantage, Satellite Sales Inc. maintains the largest warranty service center in the industry. Not only do we service what we sell, both in and out of warranty, we offer flat rate out-of-warranty service. With a large parts

inventory, and a computerized service authorization system, you are assured of the fastest possible service return.

DEALER SUPPORT

Satellite Sales Inc. provides a complete dealer support service package available to any customer. Included are advertising slicks, consumer handbooks, product catalogs and manufacturer's literature. Also available on a limited basis is our mobile showroom.

WHOLESALE SALES ONLY

Satellite Sales Inc. sells only to dealers, all retail sales are referred to our dealer network. We also do not own any interest in direct to the public type organizations.

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CORRESPONDENCE/ continued from page 78

by using their products, providing they are quality control conscious, and are price conscious. These manufacturers must realize that we, the dealers, are in a much better position to know the needs and desires of the consumers, as we are on the front line. Manufacturers are needed and must be represented on the SPACE board of directors, but you cannot continue to **control** this organization. Remember, the big bucks **you are giving came to you from me**, and dealers like myself.

"The second thing I feel SPACE must do, is to arrange for the distributors to be equally represented along with the manufacturers on the board. The distributors are the middlemen and can contribute greatly towards quality control, equipment repair problems, product price stability, and who is and who is not a bonafide, legitimate dealer. I must add that a requirement for a distributor must be that he maintains an in house repair facility with a technician qualified to back up a dealer's technical problems at all times. I am sick and tired of sending my money to a middleman money exchanger (distributor) who takes part of my earned profit, only to tell me when I receive a product bad out of the box or that fails within the first thirty days, that it will be faster for me to send it direct to the manufacturer for repair. I am also tired of dealing with distributors who are less qualified to perform in house repairs than I am.

"The third thing SPACE must do is realize that Bob Cooper is responsible for the satellite industry as we know it today. I say this with all respect and admiration for Dr. Arthur C. Clarke, and the many engineers and men who have contributed, and continue to contribute to this industry. I do not know Bob Cooper personally, and have not forced myself on this busy man at the shows I have attended. I did have the opportunity during a lull at the March 1984, Las Vegas show to order some books and take about 20 seconds to thank him for what he has done and continues to do for the dealers. I subscribe to **Coop's Digest** and depend on it and Bob Cooper for the gospel truth concerning equipment and activities of SPACE. Without Mr. Cooper's dedication I would not be in the business today, armed with the knowledge obtained from him and not from SPACE. Though a dealer member of SPACE, I learned of the Starlink lawsuit in Wichita, Ks. from the Jan. 1984 **Coop's Digest**. Now, I ask, is that the way a paid up dealer member of SPACE should have to learn things like this? I also found on pg. 46 from my July 1984 issue of **Coop's Digest** that the SPACE board met on June 5th and packed the board again with 12 pioneers, 6 dealers, 6 distributors, and 1 SMATV member. I had no say in this, but to continue to get my support, this must be changed to 12 dealers, 6 manufacturers, 6 distributors, and 1 SMATV member. The one SMATV member should not have a vote. Bob Cooper or his personally appointed representative would chair the board and would have a vote only to break a tie decision.

"In the same paragraph I read that all future meetings are closed to the press. I cannot imagine Bob Cooper being excluded from reporting on an industry he raised and in whom I as a dealer depend on for accurate information on friend or foe. I cannot rely on anyone else, or any of the satellite industry magazines that have cropped up since **Coop's Digest** to obtain my information from, until that time hoped for when SPACE, through its dealers, distributors, and manufacturers, get our act together.

"Gentlemen, I apologize for the length of this letter attached to my check for dues and hope I can send you another check next year less a letter like this. In the interim, you must know that I sincerely support Bob Cooper, Friends of SPACE, and the best interest of my many customers, who have given me their dollars, and placed their trust in me."

Lawrence E. Poyner
German Corner T.V.
11425 E. 116th St., N.
Collinsville, Ok. 74021

Humm. Like the man said, we do not know one another. And as much as I am flattered by the suggestion that the Board be chaired by 'Coop or an appointed representative,' that is not a very practical suggestion given the fact that we have numerous other

publications who would at best feel wounded by such an action. We agree it is time for Brown to rise to the primary position of handling our legal and lobbying activities and doubt he would disagree. SPACE, through its Executive Committee recently voted to reduce annual dealer dues to \$95 a year in hopes that lower dues would bring in at least three times as many members (or better; it will take more than three times as many to offset the annual loss in revenues from the previous \$300 per dealer per year). How they will treat your current year dues check, since it was mailed at about the same time as they decided to reduce dues (July 25th, actually) will be an interesting tug-of-war. Oh yes, in case you haven't noticed, not ALL of the manufacturer members on the SPACE board care for Coop; especially those who keep cropping up with poor-product assessments in CSD. Having Coop 'chair' a meeting of such a group, as long as it is manufacturer controlled, would be an exercise in futility, we suspect.

OPEN Letter

Editor's note: the following letter was prepared by David Johnson, President of Paradigm Manufacturing, Inc. and the elected chairman of the SPACE Board of Directors since last November. Johnson resigned as Chairman of SPACE late in July following a meeting of the SPACE Executive Committee and he feels 'his version' of the incident needs to be told. We agree and publish his 'open letter' to 'All Members of SPACE.'

July 31, 1984

To: All members of SPACE

In a recent interview with **Coop's Satellite Digest 2** and at the SPACE executive committee meeting in Washington, D.C., questions have arisen as to my feelings with regard to SPACE and its Board. Unfortunately, the reports of both events have been represented with some bias. It is my wish to clearly state my own views in this letter. First, may I ask that we avoid emotion and personalities when considering these statements. Often, emotional involvement in the issues at hand makes people lose track of the meaning of the primary message. Further, I would like to recognize and applaud the efforts of the Board — Brown & Finn, Bob Cooper, Friends of SPACE and others for their concern and involvement in the effort to help our young industry grow and mature.

My opinion of our primary goal is the development of an organized, professional, and mature industry.

I believe the following steps are a necessary course of action to accomplish this goal.

1. Ongoing, worthwhile and affordable training program for all dealer members.

We must be empathetic with the dealers' ability to handle the financial, and travel requirements of this program. Proper planning in this area and diligence in the preparation of the course material is very important. We must ensure the accessibility of these programs to the dealer.

2. Fair and equal representation of all members on the Board. To meet the challenge of our industry's rapid expansion and to realize a complete acceptance by "established" industry in this country, we must speak as one. This will not happen until we are one. Presently with **only about 400 dealer members** we certainly cannot speak as one now. Therefore, we must earn a rapid expansion of our dealer membership; with a combination of services, representation, training, and accountability.

3. Ongoing, worthwhile, and affordable legal and legislative effort that truly represents the views and concerns of the entire membership.

As our industry evolves, we must assert a powerful and even-handed force to solve both the immediate and the long range legal problems our industry faces. This will require thousands of hours of hard work in the future, and must be planned for efficiency and economy, in order to be affordable. Plans to deal with legal problems must be formulated with the needs of the dealer in mind. Legislative efforts, in order to be effective, must have the utmost in careful planning and membership involvement. We cannot expect meaningful progress on the hill with-

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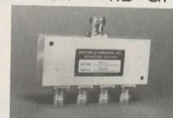
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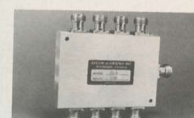
3.7 - 4.2 GHz



PD-2



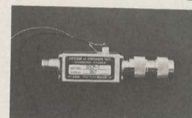
PD-4



PD-8

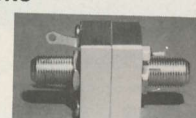
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DCP-1

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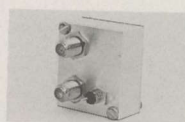


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out these necessary ingredients present. **Before** we commit ourselves to support a particular bill, **we all must agree** on its content and be willing to work for its passage.

Because this will be a tremendous job for some time to come, we must, in my view, perform most of these functions in-house with a staff attorney and lobbyist. I just can't see how we can hope to finance this with an outside vendor doing all of the work. We should delegate as much work load as can be managed to staff. Outside vendors should be called upon when necessary on an 'as needed' basis and would act under the direction laid down by the Board through our General Manager. The General Manager should manage the orderly and smooth transition to an "in-house" system of doing our job.

4. Ongoing, worthwhile, and affordable negotiations with the programming companies to ensure a long term, stable and fair business relationship, for the entire industry.

This type of important work should be carried out by a representative who will represent our membership's views without prejudice, such as Chuck Hewitt. He cannot afford to be partial to the individual view of any group within the industry, but rather be accountable to a balanced and well informed Board as a whole. In addition, business negotiations can frequently be inhibited by the premature presence of attorneys. Their expertise would be required, **but not until** the basis for an agreement is reached.

5. Provide a cohesive structure upon which the industry can mature properly.

This is achieved when we truly represent the entire industry. We must earn the support and involvement of the dealers. Any plan to achieve cohesiveness must be based on a democratic representation of the entire industry.

6. The Board must be responsible to, and answerable to the membership on all decisions and freely share its actions with the membership.

This requires that our membership be kept well informed on all matters before the Board — and a meaningful forum be available to any member who wishes to address the Board. As Board members, we must strive to truly represent the views and concerns of the membership.

7. We must maintain a constant vigil to ensure the financial integrity of the association.

In order to ensure that the direction of the association remains as the membership wishes . . . **we must avoid financial commitments that place undue pressure on our checkbook.** Crisis management is the inevitable result if this is not done. When crisis management is in effect, fiscal responsibility goes out the window. Complete disclosure of expenditures past, present and future must be available to the entire membership before we can expect to gain the trust and support of our membership. We cannot expect our membership to support us until we exercise the same kind of fiscal restraint that we all must adhere to in our own lives in order to succeed. Most people don't pay their bills 3-5 months in arrears. Neither should our association.

8. The Board must act responsibly and not delegate too much responsibility to an executive committee.

In an association as diverse as ours, not three or four people are informed well enough to carry the load alone. We should have several committees investigating and reporting on all major areas of responsibility to the Board in an organized manner. Before making decisions, the Board must make use of investigations and reports made by concerned members of the Board and the membership at large.

You will soon be deciding who you want as representatives, don't be misled by the biased views of a few. Listen to what is said, but decide for yourself. Much of what I've said has been quoted out of context and that true meaning has been wrongly emphasized in some cases. If you have any questions regarding my thoughts on any subject, please don't believe the gossip and rumors, just call and ask.

With regard to my future with SPACE, let me say that it is my wish to continue to work with the Board of SPACE in any

meaningful way that I can. I support its purpose, and will serve in any capacity the membership wishes.

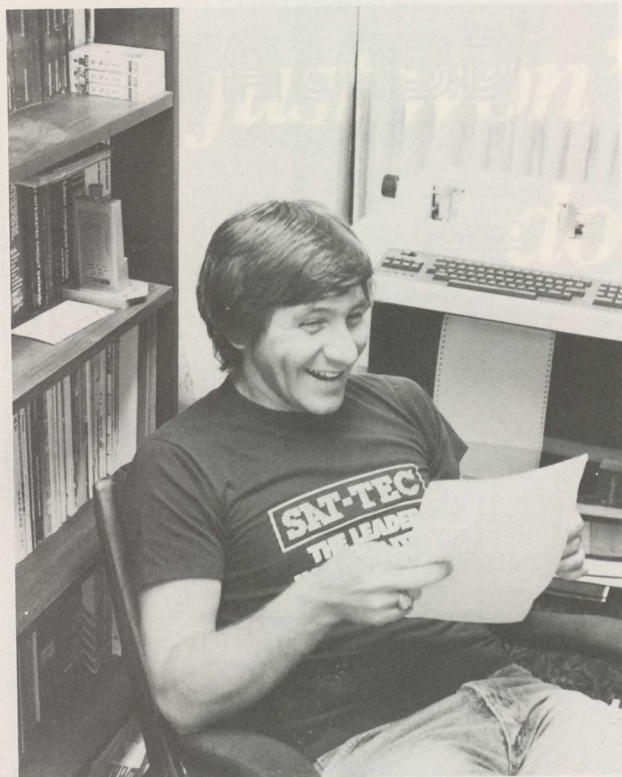
David P. Johnson
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COOP COMMENTS/ continued from page 7

"We need a special type of switch to change transponders in a new receiver. I had soon that switch in another American made receiver, but could not locate a reasonable price/delivery schedule stateside. I was in Japan, after visiting Seoul, and I decided to go shopping. I had a sample of the switch in my pocket. After asking around in the electronics trade there I found myself just on the edge of the Akihabara district (the world's largest electronics shopping area; see **CSD** for **January 1984**). At the end of a hallway I found a sign on the door. It said 'Your Drake Place'! I had to pinch myself to be sure I was not standing in Rochester or Chicago.

"Drake is a particular target of the copiers. On another trip, to Taiwan, I visited a company which I had been told might have some parts I was looking for. The entry-way was filled with models and examples of U.S. battery operated Christmas toys; Santa Claus's that clapped cymbals together, reindeer that had blinking red noses and stuff like that. When the manager discovered I was in the TVRO business, he went crazy. When he then found out I was 'Sat-Tec,' he lost total control.

"We KNOW you!" he kept telling me. 'Come, come with me!' We went into the rear where a girl was working at a drafting table. In front of her was a Drake 224 receiver. **She was actually copying the entire circuit board**, while the parts were still mounted in it, hole by hole, part location by part location. They had not taken the receiver apart to strip the board; they were simply allowing the girl to study the



"WE KNOW YOU" he kept telling me. In the rear, they were copying a Drake 224 receiver!"

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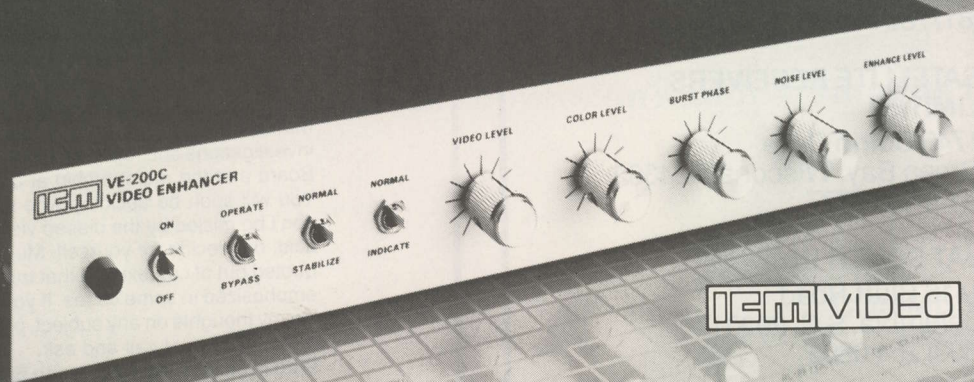
Ideal for video tape editing, duplicating, and correcting satellite receiver problems. Features include four audio outputs, four corrected video outputs, optional plug-in RF converter, fade to black capability, copyguard stabilizer and one volt peak video indicator.

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board with her eye, and then draw what she saw on the layout paper on the drafting table in front of her. Can you imagine copying a TVRO receiver board in this fashion!"

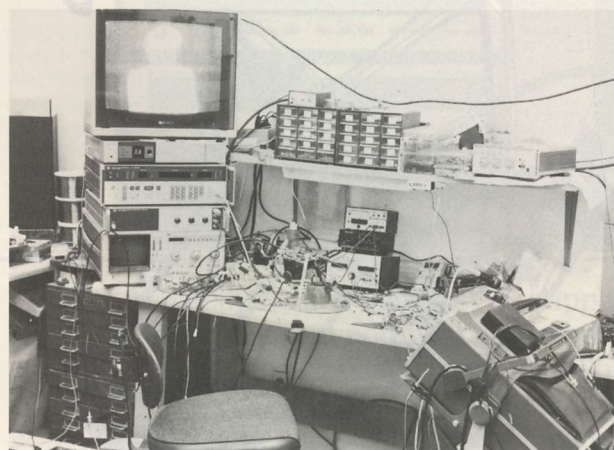
We assumed their intention was to put into production a 224-work-a-like, made in Taiwan.

"Better than that; the manager was trying very hard to convince me he was building these receivers to order. He told me 'Drake is our customer; let me show you.' Then he got out this file folder that had what **looked like** legitimate Xerox® copies of legitimate purchase orders. For example, there was one purchase order which said Echosphere on it. The manager pointed out with pride that he had a \$17,000,000 order from Charlie Ergen to build TVRO receivers.

"Of course the purchase order was a fake, just as were the orders in his file from several other well known distributors and manufacturers. But, you had to look closely to see that the Echosphere purchase order letterhead was perhaps a second or third generation Xerox® while the information typed or filled in was a **first generation** Xerox® copy. They had pasted together various copies-of-copies to create this totally false composite; just for the purpose of impressing some sucker. By this time I was getting wise to their ways. **I was not a sucker!**"

The marketplace is of course going through some very messy times. The oriental rip-off radios, repackaged in new cases, are part of the problem. But these counterfeit or copycat radios are not the entire problem by any means. There are profound changes coming in receiver design; on two fronts. First, the 'monolithic receiver' will be here before we know it. But it is not likely to be 'cheap' at first; it is still cheaper to use discrete resistors, capacitors and transistors . . . or a handful of ICs plus discrete parts, than monolithic custom parts. And if the monolithic piece fails, well, you replace virtually the full receiver guts because one resistor-equivalent 'opened up.'

Right behind the monolithic pioneers will be the digital 'divide by' high-speed 'pioneers.' They will create whole new ways to distribute TVRO signals to multiple homes or outlets that analog designers (discrete, IC or monolithic) cannot 'touch.' No, the receiver part of the



PRIVATE WORKSHOP/ hidden behind a divider that separates his office from his lab, John works on his own product designs; often far into the evening hours.

TVRO world is hardly 'mature' yet. How does Ramsey see Sat-Tec fitting into a TVRO receiver 'world' that leap-frogs itself in technology virtually overnight?

"It's a matter of timing. I would not want to be **first** with monolithic nor high speed digital divide-by hardware. First of all, the prices for the early 'devices' will be high. The receivers will be much like the first digital stereo units; technical curiosities more than true advances in consumer grade and **consumer-priced** hardware. When monolithic hits, the revolution Sat-Tec started in 1980 will start anew, **all over**

COOP/ continues on page 90

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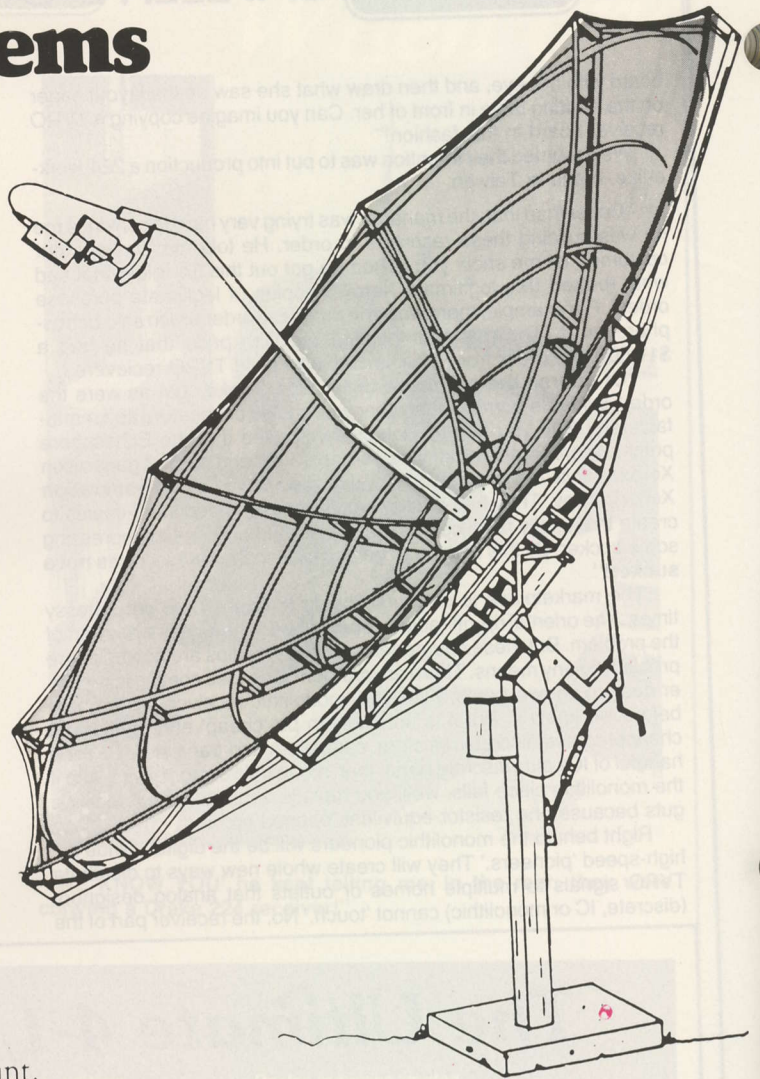
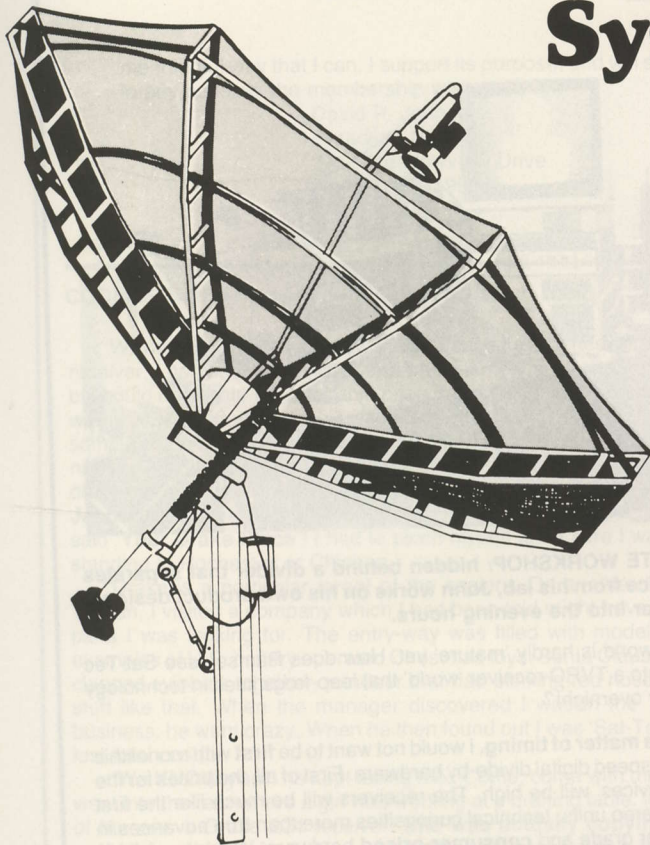
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COOP/ continued from page 87

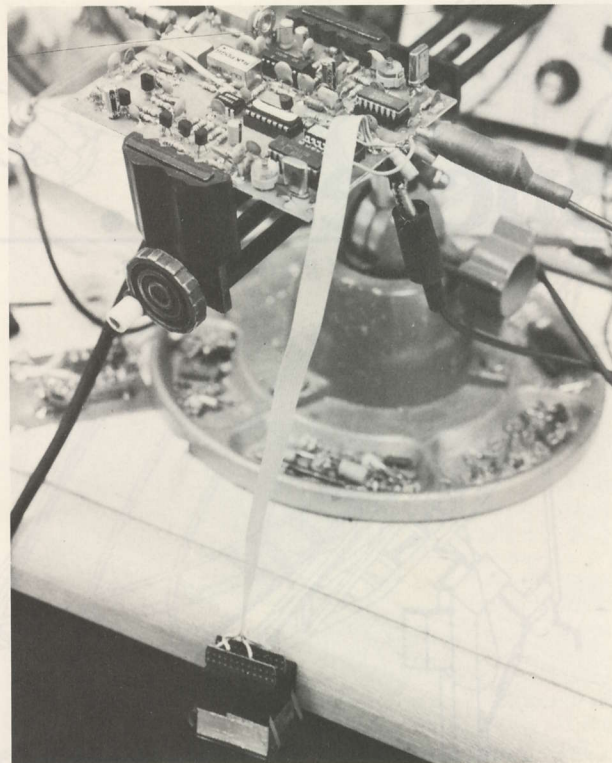
again. First there will be expensive monolithic receivers, then medium priced monolithic receivers and finally 'low priced' monolithic receivers. The same thing will follow with digital divide-by; expensive, then medium priced, and finally low-priced. In all of this there will be a point where Sat-Tec should be involved. But I don't expect us to be 'first' in either just to say we are first.

"I probably **will be** among the first to **explore** the monolithic and high speed digital parts. I am as curious as any other design engineer what they can do for receiver design. But once our engineers have done that, and we know the limitations of each, then we'll set back and wait for the dust to settle."

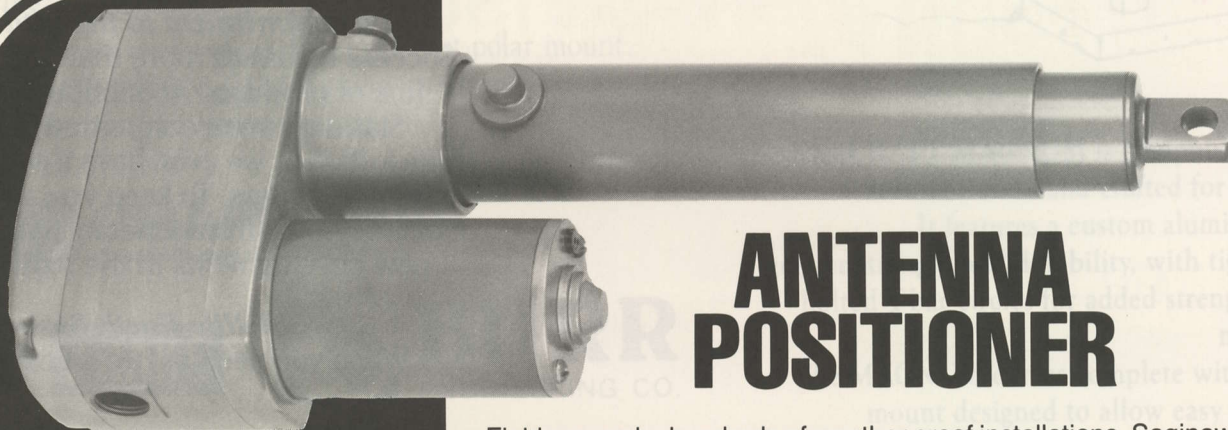
A tour of The Ramsey Electronics / Sat-Tec facility reveals that several new generation receivers are in various stages of development. Ramsey is intrigued by the shifting marketplace to block down-conversion system packaging.

"I don't believe we understand, as an industry, what the marketing or selling portion of multiple receiver systems is all about. Low cost block down conversion, originated by Keith Anderson and aped by others such as Janeil **should be** a larger market for us than single home stand-alone TVRO systems. We need more people studying how to make this happen! 'Mini-SMATV' is a sub-industry here just waiting to come out on stage. We have several concepts in that area which should push that along. I see six foot region dishes all over metropolitan regions, connected to dozens of separate sets each and offering each set connected totally independent connection to any of the transponders on say Galaxy, or F3R. There is some exciting new technology here, and it will drive the market in new directions."

The market has been hung-up on what is classically a single receiver/single home 'market package' almost from day one. There have been brief forays into multiple receivers by people attempting to sell Anderson, Locom, Janeil or TX Engineering but this format of equipment has not exactly put the 'old style' single-receiver per-antenna boys out of business. Instead of opening up an entirely new (multiple-home) market, these low-cost block down conversion de-



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PAID HIS DUES/ John's office wall collection of satellite industry trade show badges goes back to the Miami SPTS in February of 1980.

signs have largely become 'low-end' price-leaders; going into **single-receiver** homes.

"The multiple-receiver-feature has been sold as 'sizzle,' not as substance" points our Kenny Schaffer; now recovered from his stint as Terry Moore and Buzz Sawyer. "**Janeil is an excellent example of selling sizzle**; their well conceived, well done two-page spread pushing their Anderson-like receiver shows how 'expandable' the BDC system approach is. **But**, when dealers try to buy the necessary bits and pieces (signal tap off units, UHF range signal splitters and high performance UHF line amps) to make such a systems work as they cleverly depict for you in their advertisements, the dealer learns Janeil doesn't build any of the required parts. They don't even offer an instruction manual telling the dealer 'how' to do it. Anderson and Locom are marginally better in this department, but at least they have the 'decency' not to run two page truck ads suggesting they do package complete systems in this way."

That low-cost BDC turned into 'low-cost-BDC-for-single-receiver-homes' is hardly much of a surprise. Keith Anderson's original concept is as valid today as it was in 1980 when we first saw it play. That it may be difficult to re-educate dealers who have formed their own 'opinions' about the value of low cost BDC is arguable.

"I think we can thank Janeil for 'blowing' low cost BDC to date" suggests Schaffer. "They had the right idea, the right marketing concept. But they didn't care enough to back up their 'sizzle promotion' with the required bits and pieces to make what they displayed in their ads work. People got all excited about low cost **plus** multiple receivers. They had to settle for low cost **alone**. A pity . . . the multiple receiver or mini-SMATV market could have been a year down the road, now, had there been more integrity there."

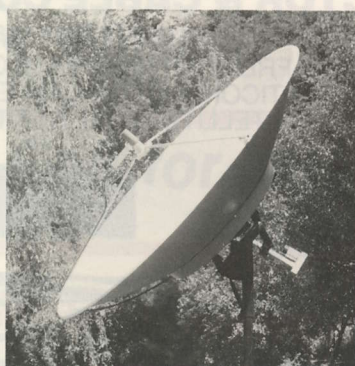
Ramsey smiles at such talk. He has appreciated having 'that year' to get his own BDC house in order. There is a host of new product here, not all 'low-cost' by any means. The first demonstration of the new BDC gear with the Sat-Tec name on it was back in Vegas in

COOP/ continues on page 94

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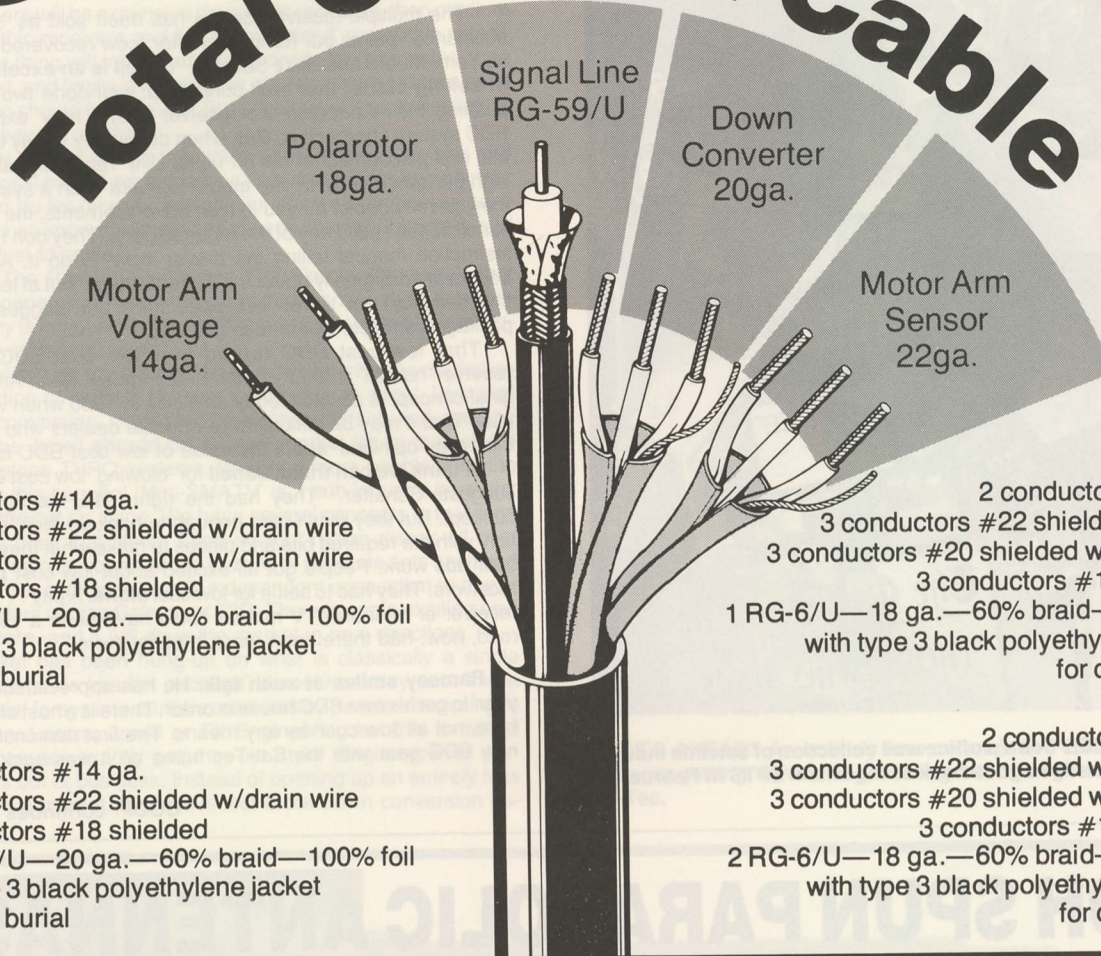
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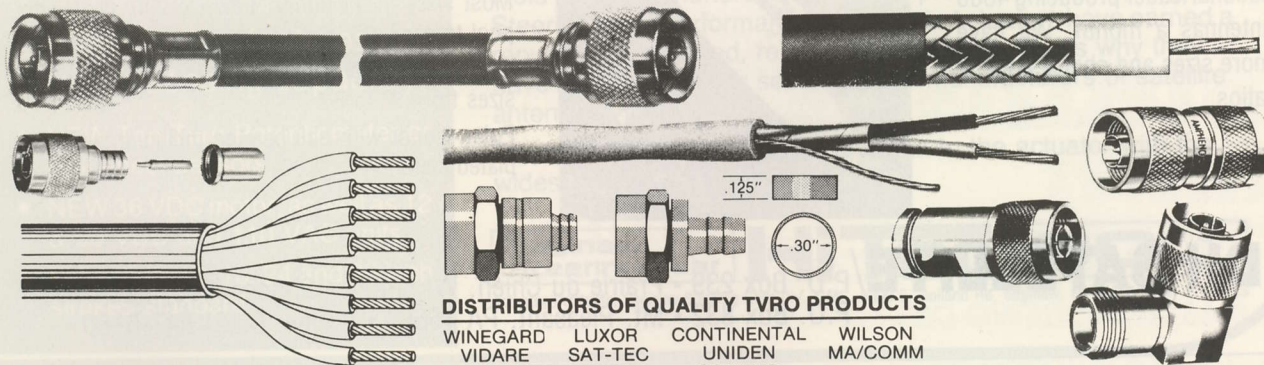
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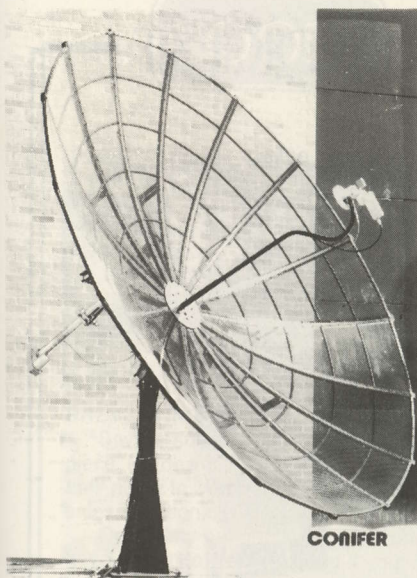
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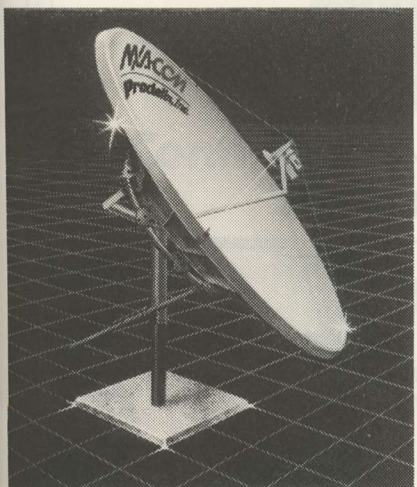
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COOP/ continued from page 91

March.

The Ramsey approach to BDC is contrary to the Anderson/Janeil approach. It is even contrary to the Sat-Tec product approach of the past. **It will not be** the cheapest BDC unit on the market.

"The systems we displayed in Vegas are at least second generation BDC" explains John. "If you really go back and research BDC, you find that Steve Richey pioneered it in 1978 or so. He was followed into the marketplace with some commercial systems from Hughes. The Keith Anderson approach was the low-end attack and Keith pretty well had the product design matured before he brought it out. It would be difficult to make it much cheaper than Keith and still have pictures."

Which suggested what approach to Ramsey?

"**Many of the things Keith did first** were ingenious. In particular, his use of a common Japanese TV tuner for selecting individual TV channels in the 450-950 MHz BDC output IF band was very creative, although I understand Steve Birkill in England may have been doing something similar way back in 1976 or so.

"**The approach we took** was to carefully study the medium priced BDC packages; such as the DX units which sell well in SMATV systems. I liked what I saw there, but did not like the price attached to that equipment. It runs 300-400% more, today, than the low-end stuff. If you take the top off of a DX 642 receiver you can see why; it is crammed with layer upon layer of circuits and boards. I decided our approach to BDC would involve high integrity circuits, such as DX uses, but with the kind of economy which Keith Anderson practices."

Which resulted in a BDC system that 'works like the high priced spread' buy which is priced more like the low priced spread?

"**Sort of in-between.** I wanted performance second to none. I wanted users to say '**THE most sensitive**, best video quality receiver is a Sat-Tec BDC'. I also wanted them to say '**THE best receiver bargain** (performance versus price trade off) is a Sat-Tec BDC receiver."

"So we have at least two such units in the stream; one for the home



SAT-TEC receivers and downconverters as far as the eye can see. We found morale high and employee dedication good.

system and one for the commercial uses. Our biggest problem at the moment is to get them into full-scale production. These receivers are so different from the traditional Sat-Tec receivers that it is just like starting a new company all over again!"

John Ramsey is one of the youngest CEO's in our field. He began his company on a card table in his home, offering bits and pieces to hobbyists and amateur radio operators. Wife Judi, involved from the beginning, has done something rather amazing. She has functioned from day-one as the firm's business manager. When it all started, that was easy enough since their's was a mail order business and keeping track of payables, and receiveables, was not that complicated. In the intervening years she has managed to stay up to date with a firm that now occupies a sprawling facility in a suburb of Rochester employing

XL10A — THE ROOF MOUNT LIGHTWEIGHT CHAMP!

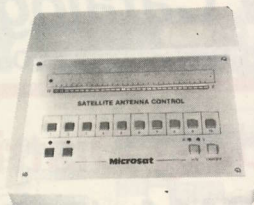
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dozens of people fulltime, managing a household, and become the mother for a son and a daughter. Her office includes a crib for the latest addition (a daughter) and she barely misses a beat switching from dedicated business manager to dedicated 'mom' all in the course of a single telephone conversation.

John and Judi Ramsey have been an important part of the TVRO industry from the day it all began. Their youthful exuberance is carefully weighted by John's dedication to engineering state-of-the-art and Judi's concern for ethical business practices. They are a team that even the Koreans will find difficult to compete with.

PREVENTING Bankruptcy/Chapter 11

Several suppliers didn't make it through the summer period, in one piece. Hardest hit have been distributors who apparently mis-judged their ability to warehouse inventory through the summer period when sales 'traditionally' slack off.

One of my pet peeves is that nobody shares information so you have no way of **really telling** if your own individual corporate sales figures are running with or against the tide. In an industry that was older, and more mature, there would be a history which we could draw from to predict just how good, or bad, we might expect sales to be in any given month.

I was therefore excited while thumbing through the Annual Report for **Avnet, Inc.** (the parent company of Channel Master) to locate a perfectly delightful business graph which broke product shipments per day, averaged on a monthly basis, down for the 'Video Products Group' of which Channel Master is the major business center.

Channel Master, a part of Avnet, Inc. since 1967, is one of the world's largest suppliers of television antennas, signal amplifiers, antenna rotors and color picture tube replacements. The Video Products Group, which Channel Master dominates, had annual sales of \$113.6 million in 1983. The annual Avnet report applauded the Channel Master contribution to corporate gross and net with the comments:

"Channel Master substantially increased the unit sales of its home satellite TV antennas to become a leader in the burgeoning home satellite industry." Another line in the typically dry annual

report format notes "... improvements in both sales and earnings... reflect... major improvements in the Company's home satellite sales..."

Of course that \$113.6M in sales in **not all** TVRO equipment (at \$1,800 per system shipped that would amount to 63,111 TVRO terminals shipped; clearly beyond CM's current abilities) but a significant portion of the gross sales is. Which brought us to the chart.

Sombody at corporate-Avnet had carefully plotted the average shipping volume per day, each business day, and from that they created a calendar-month shipping average. Now remember CM produces TVROs and they also produce other TV related equipment. Therefore TV somehow figures into the majority of that \$113.6M in 1983 sales. Now, what happens, according to the Avnet annual report, on a **daily basis** for the full year?

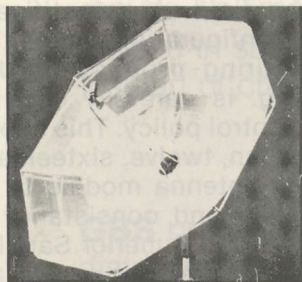
First we 'took the chart apart' and converted the dollar shipments per day to monthly shipment percentages. We wanted to see how the shipments (sales) wandered around from month to month. Then we assigned a calculated number to each month; a number between .29 and .57 representing shipments per business day (ie. .29 = \$290,000 while .57 = \$570,000), all taken from their published chart. That gave us a representative average-day-per-month for each of the 12 months. It worked out in this way:

December / .40
January / .40
February / .40
March / .42
April / .47
May / .43
June / .54
July / .29
August / .48
September / .57
October / .51
November / .45

COOP/ continues on page 98



Continental Satellite Systems



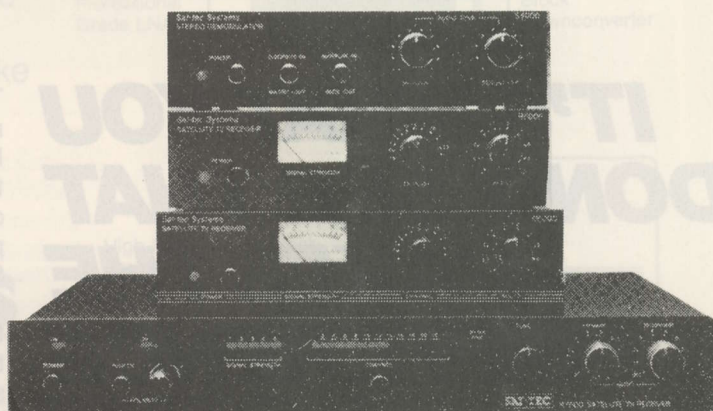
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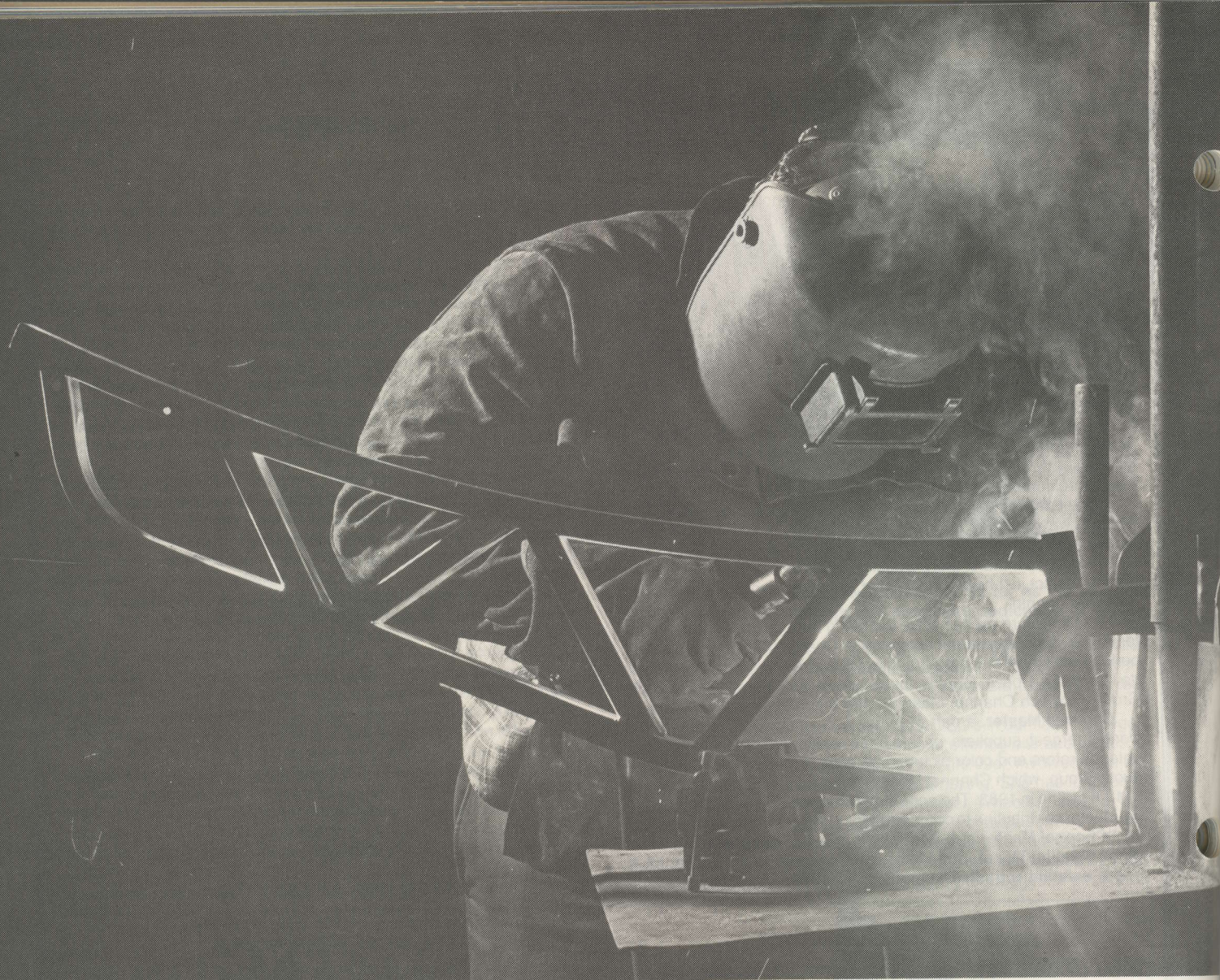


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If all this sounds painfully familiar, maybe it's time you met people who believe in *solving* your problems, instead of creating them:

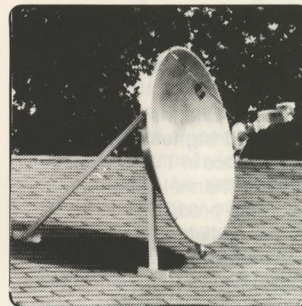


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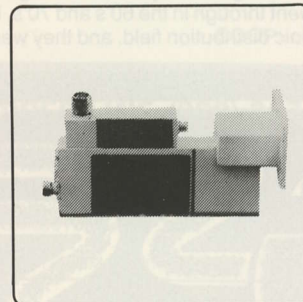
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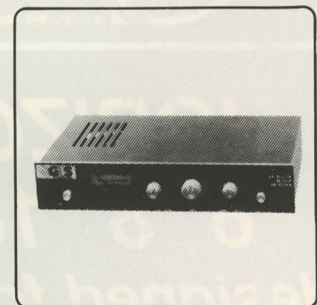
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COOP/ continued from page 95

There are several interesting patterns here. Some we can identify with. December through February are essentially 'flat,' although not the lowest month(s) of the year. The honors for low month go to July and it is a whopping 38% lower in sales (shipping) volume than the next lowest month(s); December /January and February. **Most of us can identify with July being slow.** Was July 38% lower in sales/shipments in **your** 'shop' than the next slowest month of the year? Food for thought.

The dramatic increase in sales we see all across TVRO is evident in the Channel Master figures for the period July-August-September. September is the 'highest' month of the year, accounting for 10.63% of all sales for the year. It is also sharply stair-stepped from the low in July. For example:

- 1) After a low in July, sales (shipments) increased 41.4% in August;
- 2) However, in September sales increased 39% over August which also amounts to a **96.5% increase** over the low month of July; just 60 days prior.
- 3) Between September/October and November, the sales total 28.55% of the total annual sales. The lowest three consecutive months is December/January/February which accounts for but 22.38% of annual sales.

There is just one baffling number in the Channel Master numbers; the month of **June** which is the **second highest** month of the year. This runs contrary to what most experience in TVRO shipments nationally suggesting that someplace in the Channel Master product mix there's a superior 'summer mover' in the product line.

Of course Channel Master figures are 'weighted' by the broad product line they deliver to electronic distributors nationwide. There was one paragraph we found in the 1983 Avnet report which bears repeating. It deals with the growth cycle which big-name full-line electronic distributors went through in the 60's and 70's. Parent Avnet came out of that electronic distribution field, and they were one of 'the

survivors' when other big names (such as Cramer) folded up in various stages of financial ruin.

"The day of freewheeling entrepreneur-distributor is passing. Today's successful distributor is skilled in high finance, marketing, advertising, inventory management, professional sales techniques, handling technologically advanced products, and providing an array of value-added services."

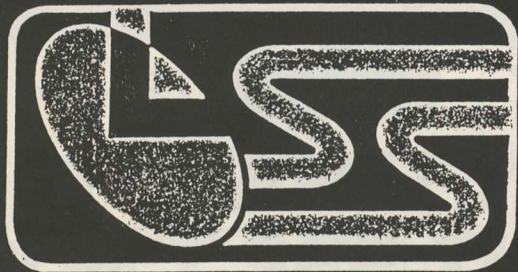
The same basic truths apply to the 'freewheeling entrepreneur-distributors' of TVRO. Their own ability to cope, and stay in business, will depend in large measure on their ability to improve their own array of **'value-added'** services.

HBO's Problem

While in New York City I kept a luncheon date with five gentlemen from HBO. They usually outnumber me and I usually don't get much to eat since they can gang up on me and ask at least five questions between each bite I take. I've been through this enough times with HBO that you'd think I would learn; a 'luncheon date' with HBO means **they eat and I talk.** Next time I'll grab a sandwich off a push cart on 54th street before going upstairs in the Time-Life Building.

I enjoy these sessions with the HBO guys. They are very-very bright, very astute and they play the game super close to their vest. Kenny Schaffer asked me once why I thought HBO execs are all in their 30's and early 40's. I didn't have an answer. Kenny did. You have to be that young to stand the pace at HBO. An older fellow would wilt and collapse with the furious pace they keep up from sun-up to well after sun-down. A surprising number are barely 30, and they carry huge responsibilities in a multi-hundred-million dollar corporation. Their way of life is not my cup of tea, but very few of them have offered to join me on Provo either. Each to his own.

This session was nuts and bolts. The nitty-gritty detail of how and when they spring their CBD marketing plan. Of the five in the luncheon crowd, four made it a point to tell me **"This entire conversation is off the record;** it is 'backgrounder material' and no part of it is to ever show up in print," Kenny Schaffer, always the analyst, suggests that they tell me this to insure that nobody higher up at HBO ever sees



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in CSD some statement which could cost the guy his job. Kenny doesn't attend these clandestine luncheons with me (nobody ever does; one time I was outnumbered 16 to 1, in Las Vegas) so he can be excused for not seeing the 'total picture' on this 'off-the-record' issue. In a nutshell, this is a tenuous and dangerous game. Big bucks are involved. Very big bucks.

In CSD/2 for August 15th we asked our 'Dish It Out' advisors to comment on what might happen, to our industry, if HBO decided NOT to bring out the CBD program. We had some curious prognostications from the participants (you really ought to go back and read what our advisors had to say; good stuff and I assure you many people on the 15th Floor of the Time-Life Building did read it carefully!). I asked our advisors that question back in late June and they had to have their answers in by July 25th. I was getting nervous with the 'missed deadlines' at HBO, and it had occurred to me that maybe . . . **just maybe** . . . the whole CBD program was a 'sham.' I sincerely hoped that was not the case, but I wanted us to be thinking about that possibility, **just in case**.

I left the lunch with an empty stomach and a filled head. If HBO was playing a sham game with CBD, **I didn't detect it in the meeting**. In fact, quite the contrary was clear to me. The program was proceeding on a schedule they were choreographing step by step to suit their own internal time table. They are balancing an incredible number of separate disciplines to make it all come together. But that is a statement that is dangerously close to forfeiting my agreement to not reveal any of the details of what we talked about. So let me explain it in a **hypothetical** way. A way that you will understand, but with sufficient lack of detail that nobody in the Time-Life Building will feel threatened by **this** decision.

There are several 'fears' at play here:

- 1) As we have repeatedly written, some factual, some educated guess, **the first responsibility and obligation of HBO is to the cable industry**. Anything we can do for them will come as 'Chapter Two,' to the existing relationships Home Box has with cable.

There are those in the industry who believe that is dangerous and a threat to our 'established dealers.' I don't share that fear at the moment and I have repeatedly urged dealers **not to panic** when the details of the program are first revealed. The **first** 'releases' will be written to satisfy the cable affiliates of HBO. We'll get our own shot shortly thereafter. Just be patient and see if it doesn't 'improve with age.' I think it will.

- 2) Our own industry's 'softness,' **slow sales this summer**, has many people concerned. We try to smile and suggest that rocking along at 18 to 22,000 per month is 'good' for June-August but there ARE people who watch what we do who are not quite so sure that is a healthy sign.

Anyone who plots the sales-cycle for TVRO has to come to the conclusion that **we have a dangerously uneven distribution year**. We have one major sales peak (September-November) and one minor sales peak (April-May in most areas of the country). That's five months of the year. The other seven months are but a fraction of the five month total.

People who understand how OEM/distributor/dealer pipelines work point out that we have a very uneconomical distribution pattern. If we were building and selling lawn furniture, there would be a logical explanation for why we have to plan to sell the majority of our product in a 90 day period (September 1 to December 1 in **our** case). But we are dealing with an all-year **indoor** electronics industry, **and it worries many** that we are asking our suppliers to crank out equipment from December 1 to April 1 at a rate greater than they ship, break even by building and shipping about the same level in April and May, and then build perhaps **twice as much as they ship** during June, July and August, just to be **ready** for the 'anticipated' big buying surge in September-October and November.

People who watch our OEM sources moving to Japan and Sweden and Korea point out that when it takes weeks or longer to get a fresh shipment of equipment delivered to the states, and distributed down to the dealer level, we are asking a great deal of 'the system' to

COOP/ continues on page 102

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3 @ 20-Gauge
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3 @ 22-Gauge Shielded
plus Tinned Copper
Drain Wire

TYPE 3
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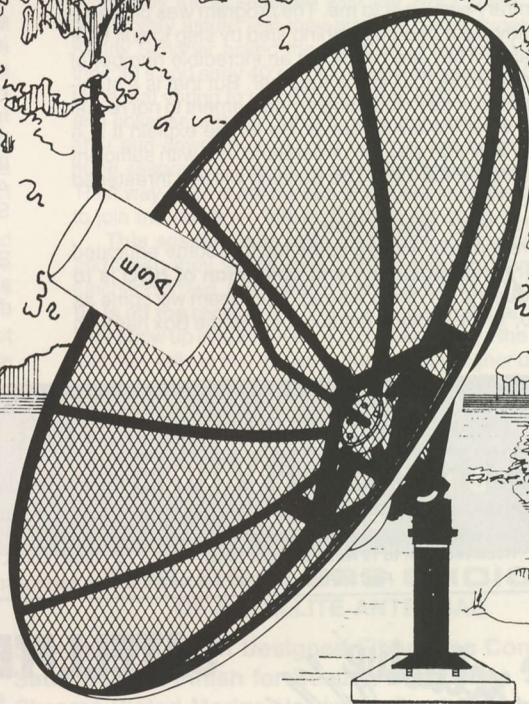
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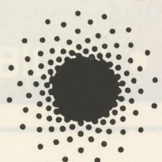
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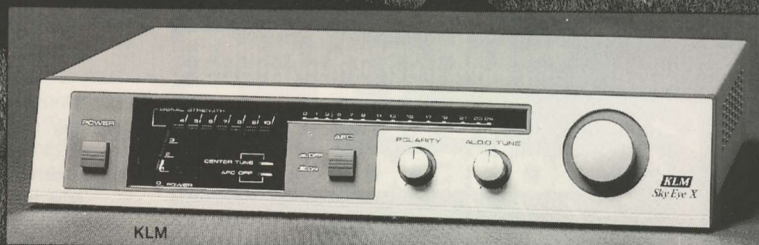
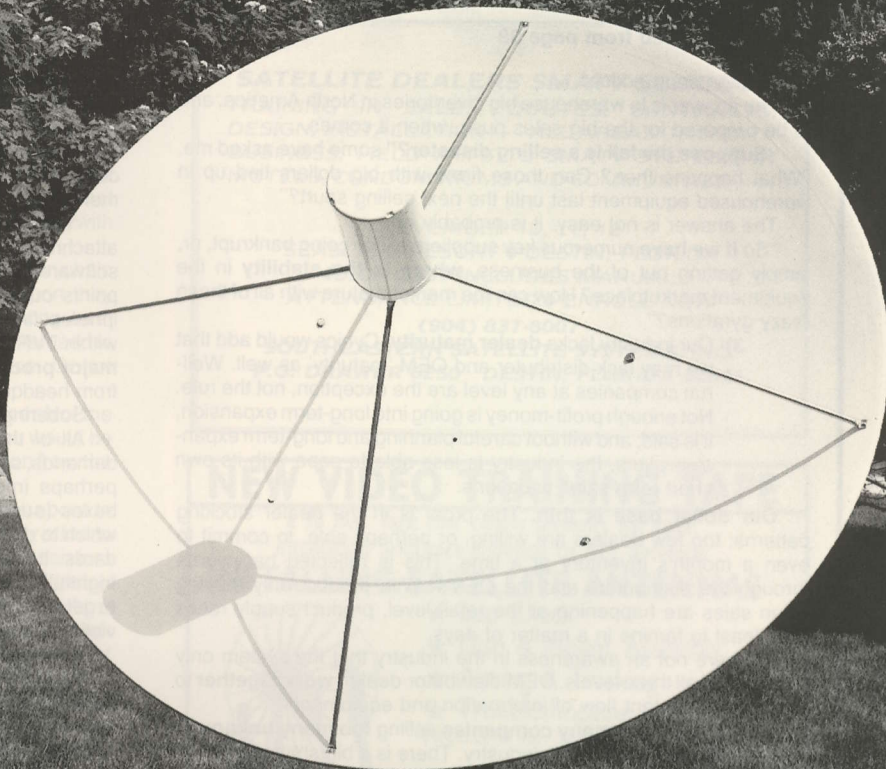
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COOP/ continued from page 99

respond on short notice.

The answer is to warehouse big inventories in North America, and to be prepared for the big sales push, when it comes.

"**Suppose the fall is a selling disaster?**" some have asked me. "What happens then? Can those firms with big dollars tied up in warehoused equipment last until the next selling spurt?"

The answer is not easy; it is probably no.

"**So if we have numerous key suppliers either going bankrupt, or, simply getting out of the business, where is the stability** in the equipment marketplace? How can the market mature with all of these crazy gyrations?"

- 3) Our industry lacks **dealer maturity**. Cynics would add that we may lack distributor and OEM 'maturity' as well. Well-run companies at any level are the exception, not the rule. Not enough profit-money is going into long-term expansion, it is said, and without careful planning and long-term expansion plans, the industry is less able to cope with its own short term sales variations.

Our dollar base is thin. The proof is in the dealer stocking patterns; too few dealers are willing, or perhaps able, to commit to even a month's inventory at a time. This is reflected backwards through the distributors and the OEMs. With product only moving when sales are happening at the retail level, product supply races from feast to famine in a matter of days.

"Is there not an awareness in the industry that the system only works when all three levels, OEM/distributor/dealer, **work together** to maintain a constant flow of information and equipment?"

- 4) There are **too many companies** selling **too many unknown-brand** products in the industry. There is a big shake-out com-

ing and there will be only a handful of survivors.

Well, I've heard that since 1980 or so. I keep waiting for it to happen, and I see each new trade show with another hundred or more 'brand new firms' exhibiting product. Some like to point out what has happened in the computer field, ticking off the six or so big-name computer firms that have **survived** 'their shakeout.' I smile and toss a copy of 'A+' or 'Byte' at them and suggest they count the advertisements from firms listed. Hundreds, thousands.

"Yes, but they all exist by selling peripheral equipment; add-on attachments to the basic big-six computers; plus, computers are software as well as hardware intensive" my verbal opponent usually points out. "TVRO may have room for a limited number of peripheral firms (such as Chaparral) but there is no 'software' sub-field within TVRO. When it is all said and done there will be perhaps **six major producers** and no fewer than four of those will be producing from headquarters outside of the United States."

Sobering predictions.

All of this, and more, is important to a firm that wants, even demands, some sort of 'standardization' with our industry. It is difficult, perhaps impossible, to interface 'universal add-on' peripheral boxes (such as CBD scramblers) to 45 different receiver brands which to date have refused to adopt even the most elementary standards. It makes marketing a **universal** home-pay-delivery system frightfully complicated, and it slows down the steps that must be taken to get from 'start' to 'finish.' And that's where we are, today. We are the victim of our own immaturity at virtually every level of our industry.

So where to from here?

Well, if it is virtually impossible to get 14 or 25 or 36 or 57 receiver manufacturers to agree on standards, you might decide that the best way to resolve your problem is to start all over with an entire new slate of players. **Suppose you sat down** and you hand selected a list of

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who the 'six survivors' might be in say 1986 or so? Maybe some of these (or maybe NONE of these) are currently producing TVRO hardware. You might go to each of these six and explain your ultimate goal; several million C band delivered individual homes wired into one gigantic 'cable headend in the sky.'

First you would select firms who had the marketing maturity to work together, as a group, to sell C band delivery systems throughout the full year. Those seven 'down' months . . . you'd work to see that they were more even with the five 'up months.' **You could do this** with an intelligent consumer awareness marketing program.

Then you'd help the six firms understand that the distribution chain must be professionally operated; that dealers get the support they need, but at the same time, the dealers **must make** a long term commitment to dealing with distributors. Those dealers who refused to see 'the wisdom' of this would simply find product scarce. Or not available.

The key to all of this working, effectively, is that **if you control** the one most-desireable marketing package (ie. software), you would be in a position to 'encourage' joint participation and cooperation from the hardware guys.

Of course all of this IS hypothetical and none of this about to happen. But, it **could ALL happen** if we don't make a stronger effort to police ourselves and to put our short term gains into a subservient position behind the long term goals of a healthy, structured industry.

While I was lunching with HBO, others were determined to show that they could be 'independent' on the scrambling issue. A mid-western entrepreneur was trying to put together a group of eight receiver manufacturers who would pony up \$25,000 each as 'seed money' to design a proprietary scrambling system which the 8 receiver manufacturing firms would run. The concept is this:

- 1) First, you develop a **proprietary** scrambling system.
- 2) Next, you license just those **8 firms** that contributed to its development to build into their receivers the required descrambler circuits.
- 3) Then you go out and **rent a transponder** and set up a company to program premium-grade movies and other programs to individual home terminals.
- 4) Then you operate the system, **with 8 firms splitting** the home terminal hardware market, and, sharing the revenues from the home-TVRO-movie channel service.

If that sounds like a nifty idea, think again. First of all, the whole premise is based upon the fantasy that this entrepreneur can 'get even' with people in the industry with whom he has crossed swords in years past, by 'freezing them out' of the descrambler circuit business. Such motivations seldom contribute to sound business plans and when that is your intention to begin with, the project is doomed to failure.

Secondly, if a firm such as M/A-COM (Linkabit) is having problems getting their scrambling act totally together, what chance do you suppose a loose federation of 8 'hand selected' TVRO receiver suppliers is going to have getting 'their act' together? Very little, I am sure. Impure motivations do not create a pure product.

So here we are on the eve of Nashville wondering just **when** and just **where**, and even just **who**, is going to appear at the end of the scrambling tunnel with a torch to light our way. Will there be some exciting new development at Nashville to bring all of this into focus? We'll know, shortly.

CLARKE Belt 'Official'?

When CSD began in October of 1979, we inaugurated our first issue by reprinting the complete Arthur C. Clarke 'Wireless World' magazine article from October 1945; 'Extra-Terrestrial Relays.' This drew attention to the fact that while our 'technology' was new, the concept our technology was based upon was really quite old. We used that same issue to suggest that our young TVRO industry should recognize this 1945 effort of Clarke's by rounding up sufficient equipment to take to Sri Lanka a TVRO to donate to Clarke. This of course culminated last fall when a group of 27 or so journeyed to Sri Lanka, and not one but three separate terminals were donated to Clarke and the University of Moratuwa. It took four years to see our 1979 sugges-

COOP/ continues on page 106

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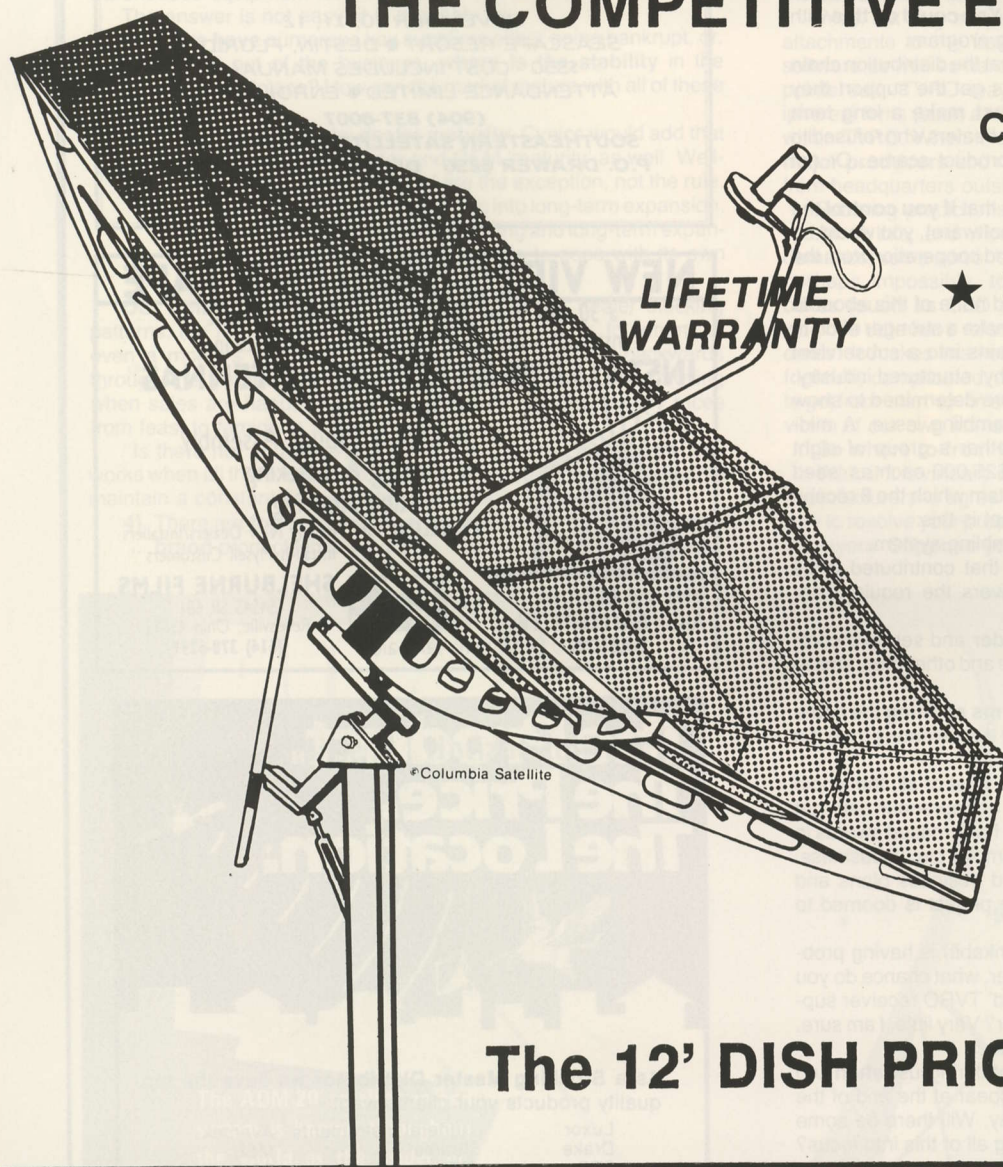
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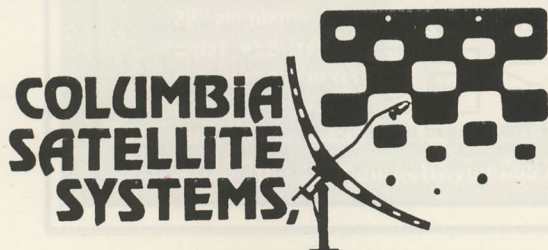
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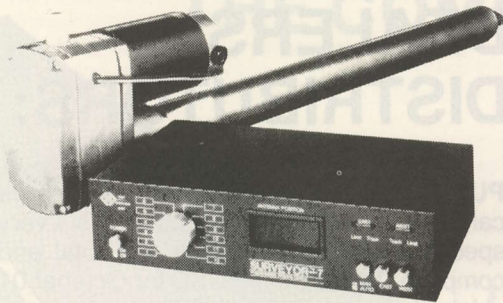
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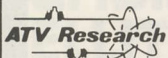
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COOP/ continued from page 103

tion bear fruit. A good idea will sustain even if it takes time.

In the same issue I pondered the long and laborious terminology of the satellite system and wondered, in print, why we didn't 'also recognize' the 'geo-stationary belt' with a far simpler and I felt more precise name. I wanted to call it the 'Clarke (orbit) Belt.' Within a year or so, as I kept hammering away at that recognition, I noticed other publications began to routinely also refer to the belt as the 'Clarke Belt.' I had several letters from Arthur C. about this; he waxed between gratitude for the honor and denial that he was so deserving. He also fretted that it would be self-serving if HE seemed to champion the idea. That was OK; I didn't mind doing that 'dirty work' and I was the one pushing it anyhow.

Through the years most of the non-scientific journals adopted the belt designation I was in favor of and we had a defacto re-naming of the belt at hand. There was one missing element; the 'official' or 'scientific community' still insisted on spelling out 'geo-stationary belt' each time they talked of or wrote about that magical balance point 22,300 miles above the equator. I hoped they would come 'along' one of these days, but also decided it would not be wise to 'push' then on the issue.

Well, victory is about at hand. The November 1984 issue of the prestigious Institute of Electrical and Electronics Engineers (IEEE) 'Proceedings' has accepted the 'Clarke Orbit' as their official terminology. It went like this.

Norman Abramson, Professor of Electrical Engineering at the University of Hawaii in Honolulu (Manoa Campus) is guest editor of the special issue on Satellite Communications and it marks the 20th anniversary of operation for the first 'geo-stationary satellite,' Syncom III. (There certainly are alot of 'anniversary/birthday' celebrations THIS fall!).

Years ago there was a suggestion that the belt be re-named. At that time, Clarke's name got tossed into the hopper along with several others. Clarke, modestly, took the position that his 1945 **Wireless World** article didn't really contribute that much to the system mechanics. He argued that the mathematical calculation of a stationary orbit point (synchronous to the earth's rotation) was a 'simplistic calculation' that was hardly deserving of such an honor. In effect, he was staying off of his own bandwagon.

Abramson has taken a far more pragmatic view of the Clarke contribution and he makes four points which led him to the conclusion that 'yes, indeed,' the belt should be 'officially named' in honor of Clarke. His points are as follows:

- 1) Clarke's 1945 'paper' included a description of the (commercial) value of such an orbit (stationary satellites, fixed antennas, low cost signal relay, worldwide coverage, et al), and,
- 2) It contained a description of the organization of a worldwide system based upon the three 'ocean areas' (Atlantic, Indian and Pacific) for third-of-world coverage (each), which ultimately **would be** the exact system selected by Intelsat, and,
- 3) It contained 'the first rough' calculation of 'link equations' (ie. how much power, how big a dish, what frequency region) from that orbit which, as Abramson notes, "(was) surprisingly close to the frequency and power levels in use today," and,
- 4) It contained the first analysis of the geometry of such an orbit including calculations of the solar eclipse period (those brief periods each spring and fall when the satellite is shadowed from the sun by the earth causing the satellites to operate either totally on stored energy, or switch to a stand-by mode).

Professor Abramson has determined that Clarke's 1945 work 'is deserving of official (read scientific-world) recognition' and accordingly he has instructed all of the authors preparing manuscripts for the November issue of 'The Proceedings' to adopt the term 'Clarke Orbit' when referring to the geo-stationary belt.

I, of course, like and applaud that official recognition. I had come to the same conclusions by at least 1979 and understand fully that I alone could not have 'forced' this recognition on the balance of the world. From this fall onward we can expect to see geo-stationary (or, geostationary) orbit (belt) in print less and less often; and 'Clarke Orbit' (belt) more widely used.

I suspect that with this 'official recognition' of the belt's 'father'

there will be a new round of awards and plaques and formal dinners which Arthur C. will be requested to attend. His fall schedule is a busy one; he is to be re-awarded the **Marconi Award** (which was originally given to him in recognition of his 'creation' of the satellite system) in a ceremony at **The Vatican** on October 1st; the award is to be re-awarded at that time in **Rome** because Marconi was Italian as you may recall. At the same time he will address the **Pontifical Academy of Science** at the Vatican. The larger Clarke event for the fall will be in Los Angeles on December 7th when **'2010: Odyssey Two'** will have its world premiere. By the absolute strangest of coincidences, our fall tour group to the Far East will be returning to the United States via **Los Angeles** on December 6th. Did you ever wonder what it took to get a set of tickets to a world-class 'World Premiere' motion picture? Stay tuned.

Oh yes, this final note. ABC was recently in Sri Lanka filming **'The World of Strange Powers'** for possible airing this fall. The series features much of Clarke's work. One of the sequences was 'shot' at the Arthur C. Clarke Centre (see **CSD** for **January, 1984**) and Arthur advises me that prominently displayed in the sequence is the **Hero Communications** 25 foot TVRO system which was donated to the University of Moratuwa by Bob and Estrella Behar during last fall's visit. Hanging around Clarke can get you into some very funny places!

PIONEER'S Pioneer Awards

Many of you will be reading this after the TVRO Industry's Fifth Birthday Party (6 PM September 3rd, Nashville) is history. I'd like to comment on some of the 'fun' I had putting it together.

Way back in early May as we announced the concept of industry-unity, and holding a 'party' to recognize that somehow, **inspite of ourselves** and our petty differences, we had stumbled along alive and kicking for five full years, I hoped that all of the industry would get behind the project. I was disappointed when a few decided this was not their cup of tea and they opted to either boycott it or not participate.

One wag suggested it was nothing but a ruse so that "Coop could give himself an award . . .". Another one suggested "Where does Coop get the gall to hold a birthday party and give awards for an industry; who does he think HE is?". I could go on, but you can see a pattern here. Ego again.

There are nine corporate co-sponsors for the Birthday Party. They are listed here (on page 55). We also have the participation of **Dr. Ed Weeks of Satellite TV Opportunities Magazine** and **Lloyd Covens of Channel Guide**. I had written to ALL of the major publishers in the field asking them to participate. It wasn't going to cost them a dime; just be present for the 'dress rehearsal' in Nashville at 3:00 PM on the 3rd and then show up appropriately attired at 5:45 to take part in the on-stage presentation ceremonies.

There are seven awards in all, this year. My concept was that the industry has done so many amazing things through the years that we need to develop a 'Hall of Fame' within the industry. Most other industries have awards and memorials which are given in recognition of extra-talented performance and these awards help people remember that we ARE all in this together and that we ALL share in the pride of what the industry accomplishes.

In addition to the seven formal awards, there is an 8th award to be given to **Arthur C. Clarke**, who inspite of his protestations to the contrary, made it all possible in the first place. There are therefore 8 caricatures which have been commissioned; 8 separate drawings typifying the look, and the work, and the contributions of these 8 people. In this issue, for example, we announce **Richard L. Brown**, the founding barrister for SPACE, as our number three award winner (that's a sequential number; it has no bearing on the importance of his selection). Brown's drawing shows him with arms folded on a stage. Behind him to his left is a series of TV screens with his head on each. This represents his 'cloning of himself' which he did so well in the fall of 1980 to insure that legislation that threatened to put our industry out of business (really before it began) was defeated. The other seven also have symbolic meaning; they are not mere human caricatures. In each drawing is the 'essence' of what that person did to contribute to a better TVRO industry.

The selection of the seven has been no mystery to me. It has

COOP/ continues on page 110

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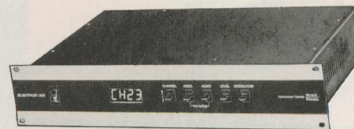
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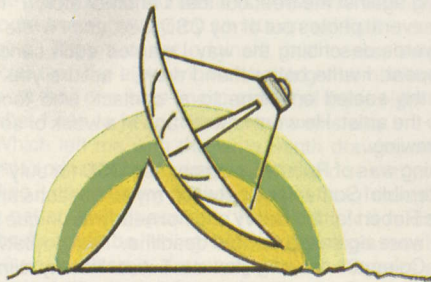


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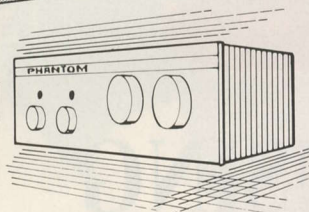
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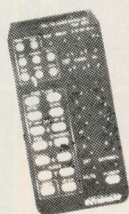
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COOP/ continued from page 107

been a mystery to others. Since I was willing to commission the artist and create the awards program, I had the ability (and perhaps 'right') to select the first seven. At the Awards Ceremony on September 3rd, each of the 1,000 or so who are fortunate enough to get a ticket to the event (the tickets are free but with seating for 'only' 1,000 we have to control how many can gain entry) will be given a 'Souvenir Program' to the party. Inside of the program is a postage-stamp size reproduction of the eight caricature prints and a brief recitation of the contributions of each awardee. At the back of the program is a 'Nomination Page' on which we ask those attending 'the Party' to nominate up to five people they would like to see added to the 'Hall Of Fame' in 1985.

I intend to turn the entire awards program over to the industry itself in 1985. I got it started, now the industry can keep it going. It will be my suggestion that the committee the industry itself selects to choose the new 'Hall Of Fame Members' in 1985 first consider the numerical tally of the nominations from the 1984 'Awards Program.' Perhaps if there is unanimous naming of five or seven new awardees, that will be all the committee needs to do in 1985. Perhaps in their wisdom they see some important contribution that has been overlooked by the 'voting members of the trade.' Who, but I for example, realized that **Bob Taggart** is the **true father** of low-cost, petalized TVRO dishes (see **CSD** for August 1984; Award Number Two, page 27)? There are other Bob Taggart type stories out there and they need to be uncovered so the awards continue to mean something substantial, and they do not turn into some sort of political patting on the back for industry politicians.

The first seven include a very diverse group of people. I looked deeply into my files, and memory, to seek out people who did 'cornerstone' type work; they laid some cornerstone that in turn became a foundation that the balance of the industry built upon. I had many pressures in that selection process. Boman Industries, as **one example**, is picking up the 'tab' for reproducing the 8 caricature prints (times 1,000 copies each, and then I **am personally** destroying the printing plates so there will never be more than '1000 originals!'), inserting them into mailing tubes, and mailing them out to those 1,000 people who first request them. **Bob Maniaci** naturally felt he had a 'right' to know, in advance, who the seven were. I had trouble disagreeing but as we sat in Niagara Falls eating breakfast and discussing this I also had 'difficulty remembering' all seven. I gave him a list which, son of a gun, when I later got back to Provo I discovered was not totally accurate. I am getting old and I have to be excused for my failing memory on occasion. It would not be until the 3:30 PM rehearsal of the award's ceremony on September 3rd that Bob Maniaci, as my co-host for the evening's event, would actually learn the 'correct' identity of all seven. I'll have to try to have a better memory the next time something like this happens.

At some point at 'least' the artist we commissioned to do the caricatures had to know the seven identities. First of all, I have never met the artist. He is a talented guy who does famous-people-caricatures for several national and regional magazines. I am purposefully not revealing his name, but many would recognize it if I did. I fed him the outlines in this way:

- 1) First I did a sketch of the drawing I wanted myself (you should have seen MY sketch for Robert Coleman with the battered dish leaning against the tree; but that's another story!). Then I enclosed several photos out of my CSD files, and I wrote a few hundred words describing the way I wanted each caricature print to appear. I write better than I draw, I assure you.
- 2) I handed the sealed envelope to a 'contact' who took the material to the artist. He went to work and in a week or so back came a drawing.

The first drawing was of Robert Coleman (see **CSD** for July 1984; page 43). It was terrible! Somewhere between my instructions and his artwork, we made Robert far too heavy and not nearly as unique as he really is. But, we were against a terrible deadline. The 'go-between' brought me the Coleman drawing just as I was literally climbing aboard the Provo Flying Service D-18 two-banger heading for Provo late in June. I said several unkind things about the artist, his mother, and the guy that carried the print to me. Then I said 'try again and take it to Carol (Graba) for final approval.' Carol in turn called Robert's wife

Lib and asked her to air express some recent photos of her husband to Fort Lauderdale. Carol had the difficult task of explaining why we needed these, what the awards program was all about, and WHY Lib couldn't say **anything** to Robert about any of this! Me, I was sound asleep on the D-18 winging towards Provo.

Well, the printing press waits for nobody and so we had to 'run' in our July issue with a slightly modified version of the original Coleman drawing. When the recent photos came in, we had the artist redo the Coleman drawing. When you see the accepted one in Nashville at the party, you will probably realize that it is only vaguely similar to the one we printed in July. I was planning to send the original (printed but not acceptable) to Robert as his own souvenir, but the artist had a fit of anger and destroyed it. Artists are temperamental.

Even though the artist was getting sealed envelopes from me and I was getting sealed large envelopes back from him (with the original drawings inside, for my approval), I was still uneasy about the 'security.' After all, there was a contest going on here and if anybody correctly guessed the full seven identities they might end up on Provo as guests of Boman and CSD/WIV this winter! So I created a new bit of subterfuge. I had the artist do **nine** drawings. Not wanting to waste a drawing (they are not inexpensive, as Boman can relate to you!) **I had the ninth one done of myself.** I did this one early, making it appear that the full 8 were turned in late in June, knowing just to myself that **one of the 8 (me) was not 'real'** and that there would be a 'last minute' addition late in the game.

It was not too long after I turned in the 8, in sealed envelopes, that I heard the 'authentic report' that I was going to receive one of the awards. That amused me of course but when I traced the story and found out that this 'person knew from good authority' this **was** the case, I immediately was glad I had taken the extra measure of precaution to withhold the **real 'number 8'** until I could deliver it to the artist and insure that its' identity would not be revealed.

All of this seems frightfully silly to me. I am far too sane to believe that **any** of this **REALLY** matters to most of us; the awards program is simply something long overdue in the industry and, like the Birthday Party, something the industry should have done for itself. And probably would have, had it not been so busy the past nine months devouring its own young.

There are now 'nine originals', if you overlook the double originals of Robert Coleman (of which only one still exists). I am torn about what to do with them. We do not intend to award them to the awardees since they are receiving something more special than that. **What I would very much LIKE to do** is to give them to the industry's trade association after extracting a promise that they will forever hang in the entry way of the trade association, and if anything ever happens to make that impossible, they will go to my son Kevin who likes to collect original things. That's what I would **like to do**. Whether I do, or not, will depend upon how the soon-completed SPACE elections turn out. If not this year, I can always 'give them' to SPACE in 1985 or so.

I do have a complete set myself, of course. I am no fool. I have a very special set which nobody else will ever have. In the process of preparing something like this for publication, the printer prepares a proof set; it is called a **'blue-line'** in the trade. The blue lines are 'blue inked' rather than black and they are on a shiny type of paper which unless protected will fade rapidly, and badly. On each I have written, with shakey hand, **"Copy # 1; July 25, 1984"** and my signature. Those are now all mounted in our new WIV videotape editing/computer room and someday my son Kevin will be the curator for their safe keeping. They are not originals, but to me, they are even more 'special' than the eight original drawings themselves. There will never be more than one 'blue-line' proof set of these eight drawings and I will do what I can to keep them from harm's way.

Which left me with the extra, ninth drawing, of myself. I do not intend to print it; I can live without that and so can you. Carol Graba, in sending it down for my approval (even Carol thought I was one of the '8' to get an award) penned **"I don't think it is distinctive enough; anybody could be 'hiding' behind those glasses!"** Susan, my wife for 18 years, liked it. Kevin, my son for 15 years also liked it. **They have elected** to have it framed and it will hang someplace in our home where the occasional industry visitor who drops in can squint at it and say "Oh yeh, I remember reading about that." And add, **"Aren't the glasses too big???"**

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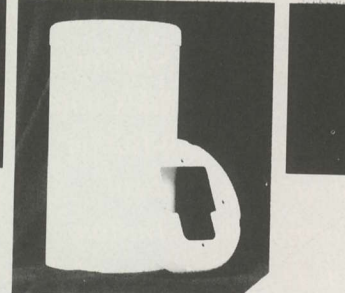
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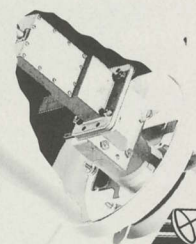
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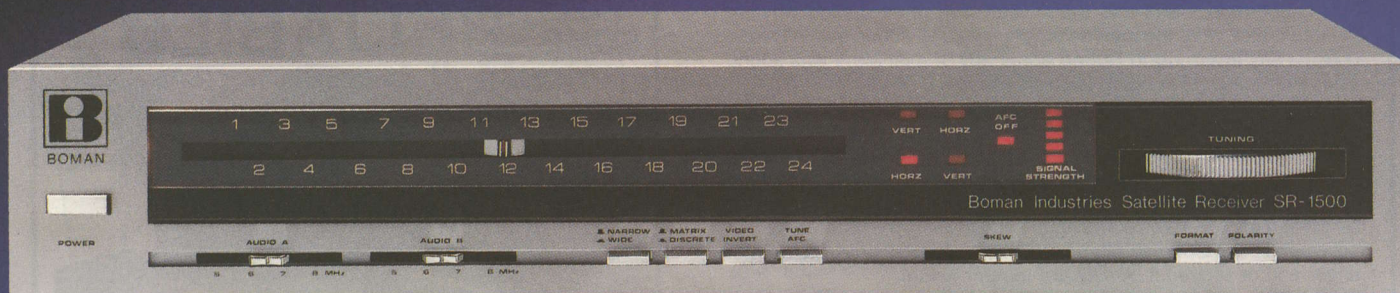
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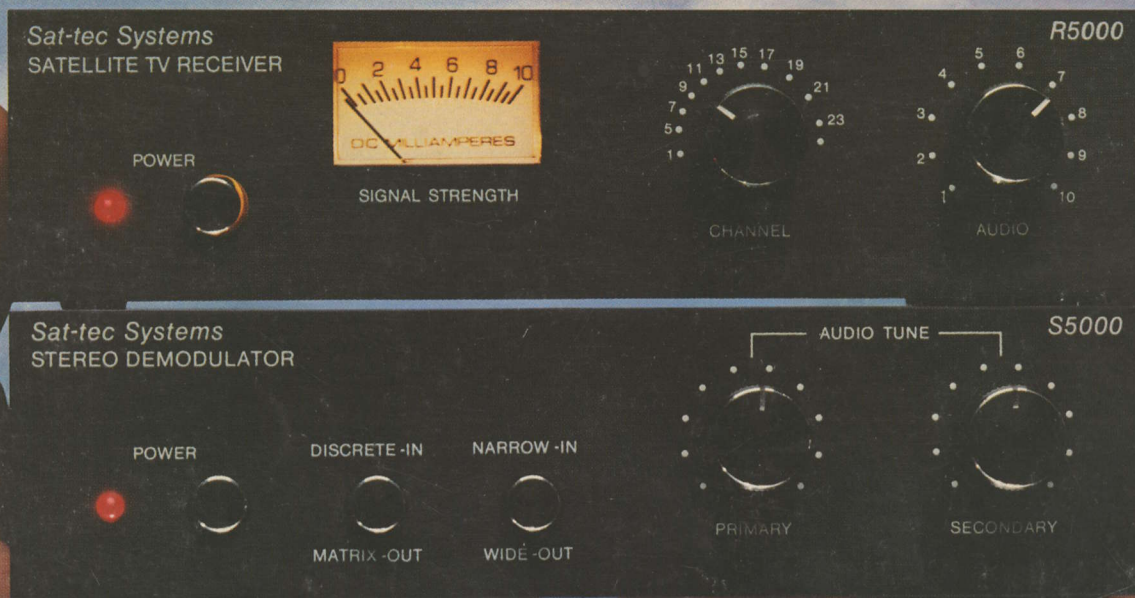
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